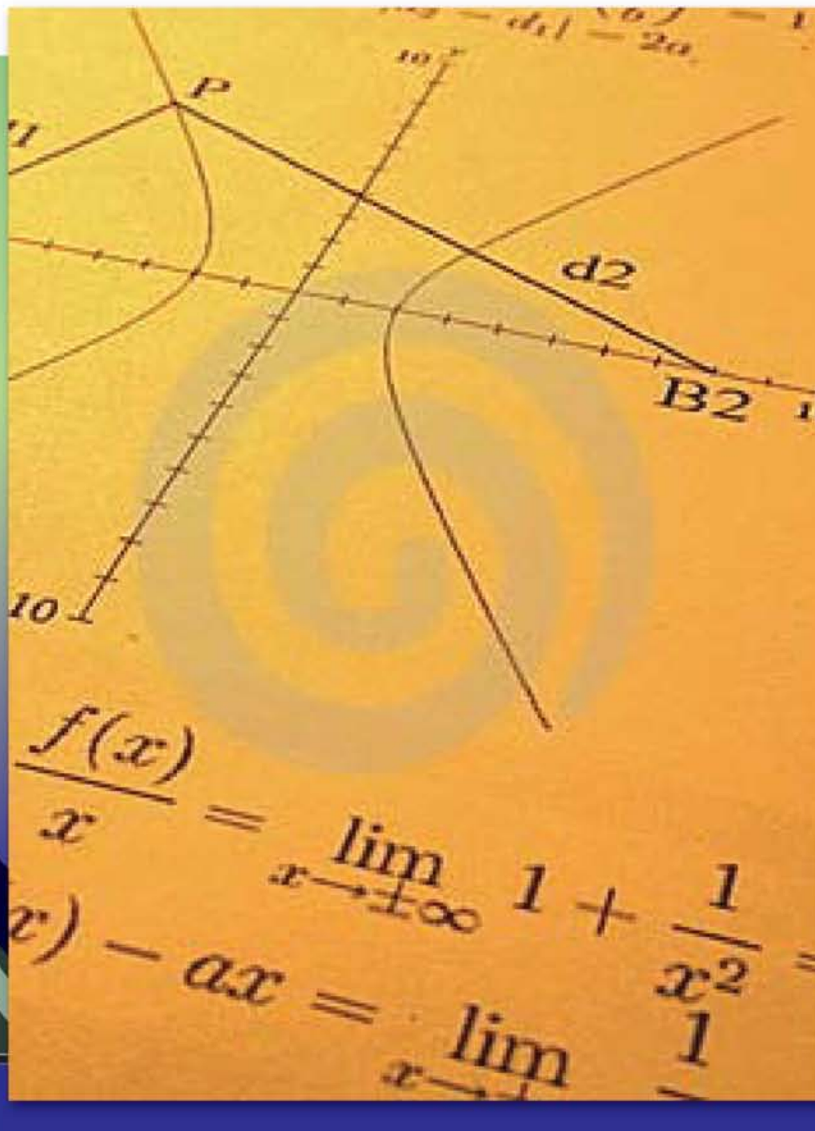
OhioCollegeTechPrep
Ready for College. Ready for Life.

Greater Northwest
Ohio Consortium

Senior Math Course

Course of Study



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Course of Study
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Course Description

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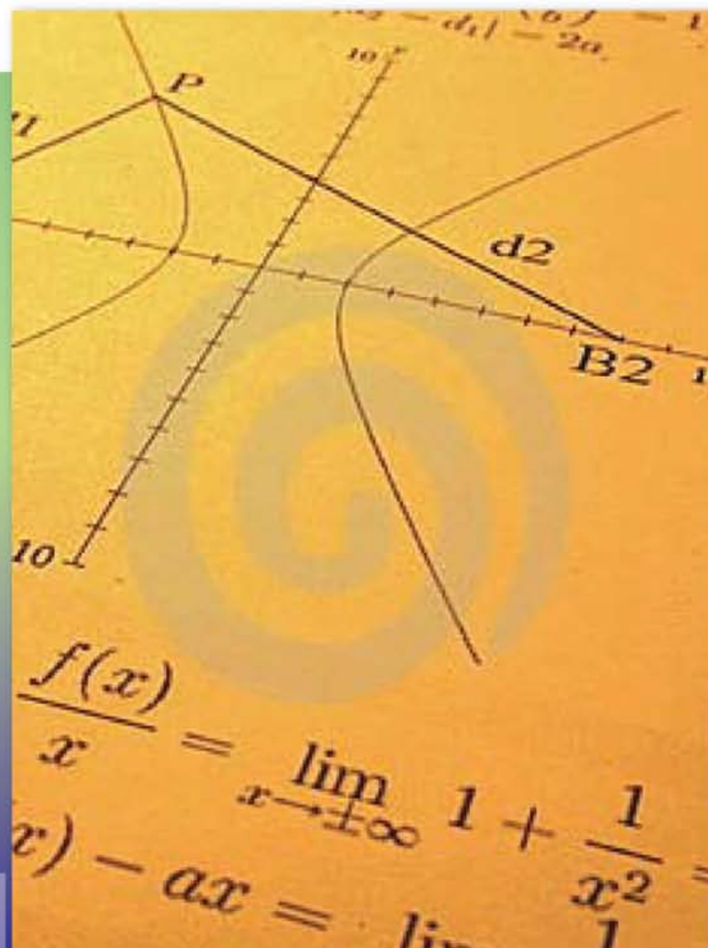

Acknowledgements

Senior Math Curriculum Development Committee
Greater Northwest Ohio College Tech Prep Curriculum

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- The K-12 school districts that provided the staff members that made up the development committee:

  Hicksville Exempted Village School District
  Sylvania City Schools
  Washington Local School

- The post-secondary partners that provided the staff members that made up the development committee:

  Northwest State Community College
  Owens Community College
  The University of Toledo

- For additional resource development:

  Jenè Drage, Maumee High School
  Laurie Fouts, Penta Career Center
  Erin Grieger, Central Catholic High School

- For Technical content editing:

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  Judy Cotner, Toledo Public Schools, Retired
  Pamela Krempak, Owens Community College
  Dale Price, Toledo Technology Academy

- The Greater Northwest Ohio College Tech Prep Consortium and the Government Board for funding and staff support:

  Nancy Pietras, Executive Director
  James Jennings, Consultant
  James C. Posta, Editor
  Pamela Smith, Final Edit

Approval by School Board

Resolution

Your school board name here

WHEREAS, the *(name of your program)* Advisory Committee of *the (name of your school district)* has reviewed the *(name of your program*) Course of Study, and WHEREAS, the course of study is based upon the Greater Northwest Ohio College Tech Prep Consortium's Tech Prep Competencies for *(tech prep pathway name),* and

WHEREAS, the *(name of your program)* Advisory Committee has reviewed these competencies and has edited competencies to address local labor market needs, and to acknowledge the school district's ability to offer specialized programs,

NOW, THEREFORE, BE IT RESOLVED, in accordance with the superintendent's recommendation, that the *(name of your school district)* adopt the *(name of your program)* Course of Study.

Approval date: ___________________

______________________________ ______________________________

Superintendent Board President

Superintendent Board President

Senior Math Course Description

Course Objectives:

Senior Math has seven essential objectives:

1. Build competency in the skills of algebraic manipulations.
2. Present topics and skills necessary in the study of algebra, geometry, and trigonometry at the college level.
3. To develop a wider range and a more competent level of problem solving techniques.
4. Encourage independent critical thinking skills in a mathematical context.
5. To introduce additional families of functions and their graphic behaviors.
6. Use numeric and/or graphic approaches to solve equations and inequalities and to determine the behavior of functions.
7. To develop an appreciation for mathematics by integrating the concepts with application in careers.

Overview of Program

The Senior Math Course at *(name of school)* is a one credit course designed for 12^{th} grade students who are interested in pursuing post-secondary education upon graduation. The course curriculum is based on the Ohio Academic Mathematics Content Standards and is targeted to the student who has completed Algebra II by their junior year and is looking for a quality math course focused on college readiness. The curriculum is the result of a comprehensive review and refinement of the Ohio Academic Mathematics Content Standards document by post-secondary and secondary math faculty during the development of the Senior Math Course.

Note that no specific text book is recommended for this course, while extensive materials for lessons are provided within this document, teachers may want to have additional resources available for supplemental worksheets and reinforcement of concepts. Also, there is reference to the use of a graphing calculator within various lessons; no specific graphing calculator is recommended or endorsed; that specific decision is up to the teacher or school district.

The course utilized inquiry-based pedagogy as the instructional model.

Inquiry-Based Laboratory Experiences

Inquiry-based instructional strategies focus on delivering content through methodology in which students learn by investigating answers to complex, authentic questions and in-depth scenarios and teachers serve as resources rather than the provider of information.

The instructors that developed the units contained in this document have attempted to formulate real-world situations in an attempt to make the academic content have meaning for the students.

Inquiry-Based instructional techniques may be an instructional strategy that is unfamiliar to the potential classroom teacher. This document alone cannot make the teacher an Inquiry - based classroom practitioner. There are lots of resources on the internet, just goggle Inquiry-based instruction, or project-based instruction or even problem-based instruction and you will find literally thousands of resources. Below is a very select list of resources that we used to develop and education our curriculum developers:

- www.bie.org Buck Institute for Education
- www.ohiorg.org Ohio Resource Center
- http://www.edutopia.org/teachingmodules/PBL/index.php The George Lucas Educational Foundation

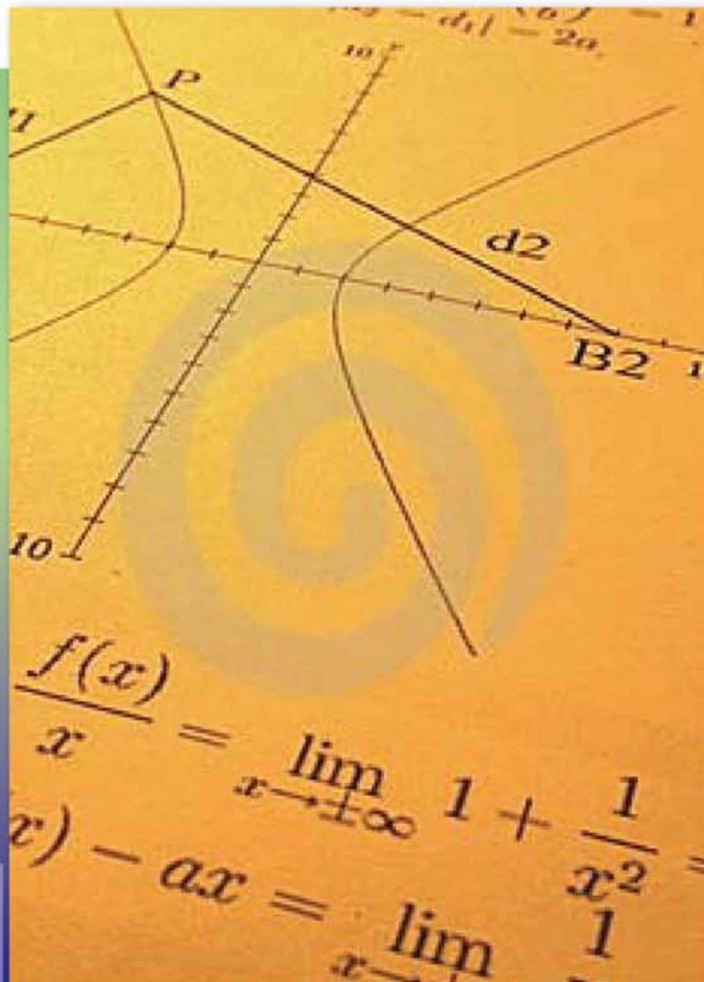
Students are encouraged to take the correct classes so that they are prepared for their next step in life. The following pathway chart is a recommended sequence of courses for high school students interested in a career technical concentration and being ready for post-secondary academics. Students should consult with their high school counselor and their parents.

Ohio Core

9th Grade	10th Grade	11th Grade	12th Grade
English 1	English 2	English 3	English 4
Algebra 1	Geometry	Algebra 2	Senior Math
9th Grade Science	Biology	Chemistry	Physics
Social Studies	Social Studies	Social Studies	Social Studies Elective/Financial Literacy
Health/PE	PE	Career Focus	Career Focus
Introduction to Computers	Elective	Coursework or Elective	Coursework or Elective
Foreign Language	Foreign Language		

Scope & Sequence

Senior Math Course



Scope and Sequence

Preparing for ACT 16

Functions Unit 56

Geometry 130

Trigonometry 191

ACT Unit

ACT Unit Calendar

Day 1-2	Complete practice test as found online at www.act.org
Days 3-15	Present the topics that students are weak in as shown by their performance on the practice test.
Days 16-17	Students explore the ACT website
Days 18-19	Complete practice test as found on-line at www.act.org
Day 20	Go over the practice test

Note: At the end of the ACT unit lesson plans are an assortment of handouts and student worksheets.

ACT Unit	Days 1 - 2

Daily Objective	**The students will complete the ACT practice test.**	**Ohio Content Standards**	
			This covers 11th/12th grade benchmarks and indicators
Materials Needed	The ACT practice test downloaded from ACT.org		

Activities	**Time Allotted**
The students work on completing the practice test	40 min

Journal Prompt	Assessment

Notes

ACT Unit				Days 3 - 15
Daily Objective	**The students will be presented the topics that they were weak in from the practice test.**	**Ohio Content Standards**		
Materials Needed	Worksheets over topics presented Also refer to ACT.org website "Preparing for the ACT"		This covers 11th/12th grade benchmarks and indicators	

Activities	**Time Allotted**
The students work on the topics that they are weak. They have worksheets to complete.	40 min

Journal Prompt	Assessment

Notes:
See sample worksheets based on student opportunities for improvement

Also see, ACT document "Preparing for the ACT" either from the ACT.org website, or see your counselors, they may have copies of the document.

ACT Unit			Days 16 - 17
Daily Objective	**The students will explore the ACT website**	**Ohio Content Standards**	
Materials Needed	Computer Lab	This covers 11th/12th grade benchmarks and indicators	

Activities	**Time Allotted**
The students will explore the ACT website to complete sample questions and to understand how to sign up for the test.	40 min

Journal Prompt	Assessment

Notes

ACT Unit	Days 18 - 19

Daily Objective	The students will complete the ACT practice test.	Ohio Content Standards	
			This covers 11th/12th grade benchmarks and indicators
Materials Needed	The ACT practice test downloaded from ACT.org		

Activities	Time Allotted
Notes The students work on complete the practice test	40 min

Journal Prompt	Assessment

Notes

ACT Unit	Day 20

Daily Objective	The students will go over the Practice test.	Ohio Content Standards
Materials Needed	Their Practice test.	This covers 11th/12th grade benchmarks and indicators

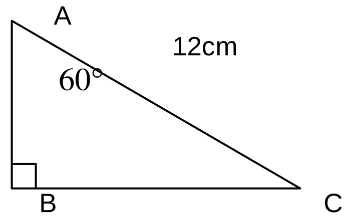
Activities	Time Allotted
The students will go over the questions missed on the Practice Test	40 min

Journal Prompt	Assessment

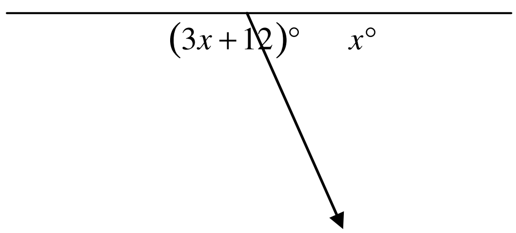
Notes

ACT Prep Review

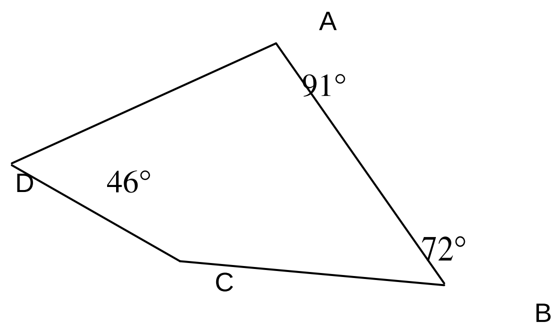
1. Find the length of $\overline{AB}$ and $\overline{BC}$.



2. Find the value of the obtuse angle formed by the line and the ray below.



3. The figure below shows quadrilateral ABCD. What is the measure of $\angle C$?

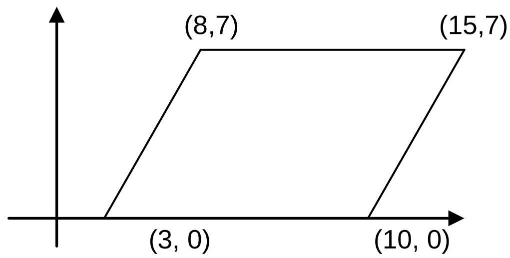


4. If 36 candy bars cost $24.84, how much does one candy bar cost?

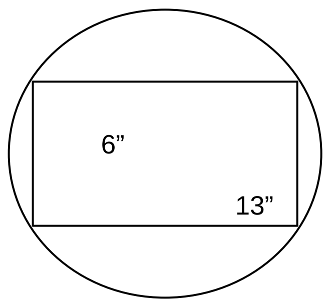
D. Membranes

24. Describe the classification of covering and lining membranes
    a. Cutaneous membranes
    b. Mucous membranes
    c. Serous membranes
    d. Synovial membranes

5. In the coordinate plane below, the points (2, 0), (7, 6), (9, 0), and (14, 6) are the vertices of a parallelogram.
What is the area of the parallelogram?



6. A 6-inch by 13-inch rectangle is inscribed in a circle as shown below. What is the circumference of the circle in terms of π?



7. On a number line, point A has coordinate -10 and point B has coordinate -3. What is the coordinate of the midpoint of $\overline{AB}$?

8. The cost of a hotdog and a drink is \$2.08. The cost of 5 hotdogs and 2 drinks is \$7.13. What is the price of the drink?

9. The measure of two angles of a triangle are $49°$ and $61°$. What is the measure of the third angle?

10. A triangle with a perimeter of 48 inches has one side 18 inches long. The lengths of the other two sides has a ratio of 2:3. What is the length, in inches, of the *longest* side of the triangle?

11. What is the y-intercept of the line in the coordinate plane that passes through the points (3, 7) and (-6, 4)?

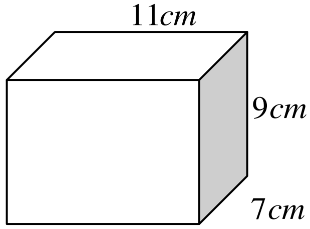
12. What is the slope of the line that is perpendicular to the line $7x - 3y = 18$?

13. If $f(x) = x^2 + 4x - 3$ and $g(x) = \sqrt{x}$, then what is the value of $\frac{g(5)}{f(3)}$?

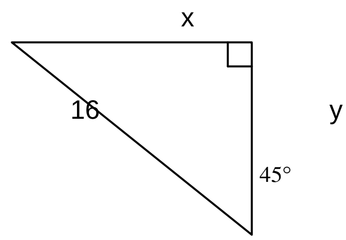
14. Solve: $|4n - 6| \le 26$

15. Find the length of a segment in the coordinate plane that has endpoints at (-2, 8) and (4, -9).

16. Find the volume:



17. Find the value of x and y on the triangle below.



18. Simplify: $\left(\dfrac{2x^{-5}}{7y}\right)^{-3}$

19. Solve: $4x^3 + 24x^2 + 36x = 0$

20. Factor: $y^3 + 216$

ACT Prep Review

1. A rectangle is three times as long as it is wide. If the area of the rectangle is $192 in^2$, what is the length of the rectangle.

2. Walter has 24 marbles in a bag. There are 10 red, 5 yellow, and 9 blue marbles in the bag. If a marble is chosen at random, what is the probability that it is yellow?

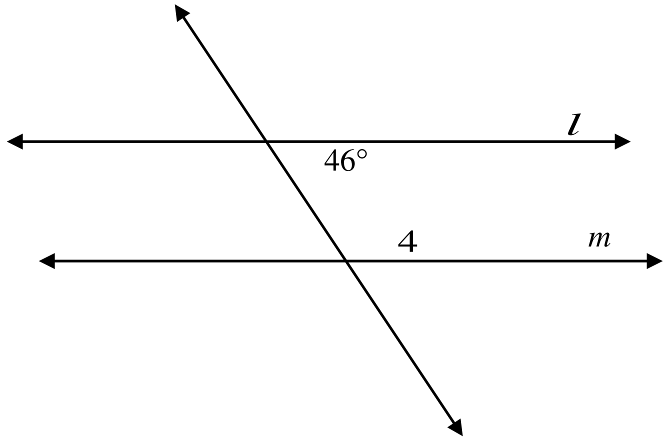
3. The graph of a circle in the coordinate plane is given by the equation $(x-6)^2 + (y+7)^2 = 12$. What is the area of the circle in terms of π?

4. Simplify: $\sqrt{72}$

5. What is the slope and y-intercept of the line $7y = -8x + 14$?

6. Find the mean, median, mode, and range of the following quiz scores: 68, 89, 72, 95, 88, 89, 96.

7. In the diagram below, line *l* is parallel to line *m*. What is the measure of angle 4?



8. What is the sum of the 2 solutions of the equation $n^2 - 16n + 39 = 0$?

9. Factor Completely: $x^4 - 16$

10. In the coordinate plane, what is the slope of the line joining the points $(4,-3)$ and $(9,2)$?

11. Multiply: $(2xy - 5)(3x^2 - 10xy^2 - 8)$

12. Find the equation of the line that goes through the point (3, -2) and is perpendicular to $y = 4x - 7$.

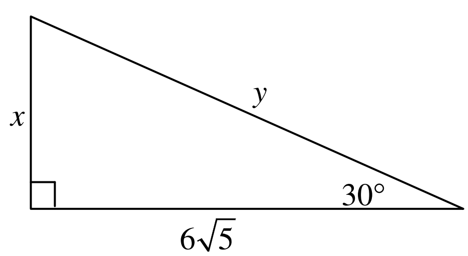
13. Factor: $3x^4 + 9x^3 + x^2 + 3x$

14. Simplify: $\dfrac{6x^2 - 21x - 45}{2x^2 + 11x + 12}$

15. Find the length of the segment in the coordinate plane with endpoints of (10, -2) and (3, 7).

16. The area of a square is 144 square feet. What is the perimeter?

17. Find the value of x and y.



18. Condense the expression: $2\log_5 x + \log_5 8$

19. The school drama department needs to sell $2140 worth of tickets for their next performance. The plan to sell 500 tickets. The cost of an adult ticket is $5.00 and the cost of a student ticket is $3.00. How many adult and student tickets do they need to sell?

20. Solve: $|30-5x|=15$

21. Determine whether the lines are *parallel, perpendicular,* or *neither.*
Line 1: through (0, 0) and (5, 2)
Line 2: through (0, -4) and (-2, 1)

22. Perform the indicated operation: $\begin{bmatrix} 2 & 8 & -2 \\ 0 & 2 & 9 \\ 11 & -7 & 3 \end{bmatrix} - \begin{bmatrix} -1 & 0 & 12 \\ 8 & 5 & 5 \\ -1 & 0 & 4 \end{bmatrix}$

23. Simplify: $\dfrac{2x^{-3}y^{-2}}{4x^{-6}y}$

ACT Prep Review
Basic Factoring

****Factor Completely:**

1. $3x^2 + 7x + 2$

2. $4x^2 - 9$

3. $3c^2 - 8c + 5$

4. $x^2 - 15x + 56$

5. $5y^2 + 4y - 1$

6. $8a^2 + 32a + 24$

7. $6a^2 - 5a - 2$

8. $9 + 6k - 8k^2$

Solve by factoring:

9. $7x^2 + 8x + 1 = 0$

10. $2p^2 + 7p = -3$

11. $5x^2 + 6 = 17x$

12. $7m^2 = 9m - 2$

13. $3p^2 + 7p - 6 = 0$

14. $3 - 4c = 4c^2$

15. A rectangle has an area of $3x^2 + 5x + 2$. Find the length and width.

16. A square has an area of $4x^2 + 20x + 25$. Find the length of each side.

****Solve using the quadratic formula. Leave answers in simplest radical form.**

17. $x^2 - 3x = 10$

18. $7x^2 - 2 = -2x$

19. $3x^2 = 8x$

20. $\dfrac{n+3}{n-1} + \dfrac{6}{n+5} = 8$

21. $9x^2 - x + 7 = 4$

22. $6x^2 - 8 = 5x$

ACT Prep
Worksheet
Circles, Polygons, Factoring

1. What is the center of the circle whose equation is $(x-8)^2 + y^2 = 32$?

2. What is the radius of the circle whose equation is $(x+6)^2 + (y-3)^2 = 169$?

3. Find the area and circumference of a circle whose equation is $(x-3)^2 + (y+8)^2 = 121$.

4. What is the slope of the line containing the points (6, 2) and (-12, 3)?

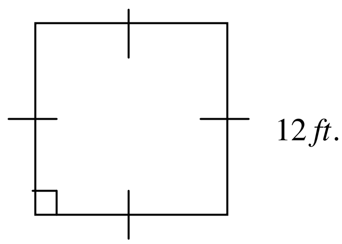
5. A rectangular room is 5 feet narrower than the length. The area of the room is 644 square feet. Find the dimensions of the room.

6. If one diagonal of a rhombus is 20 inches long and the other is 12 inches lone, what is the length of each side of the rhombus?

7. When $x = \frac{1}{5}$, what is the value of $\frac{8x-2}{7}$?

****Find the area:**

8.



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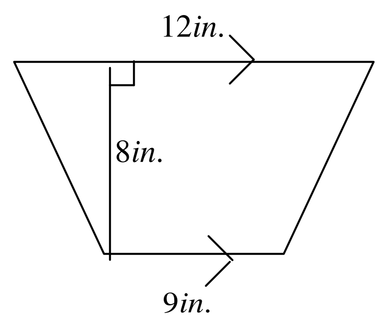

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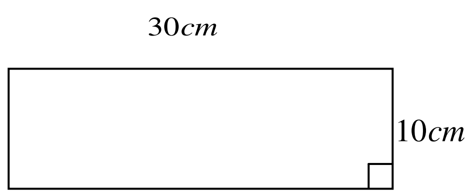

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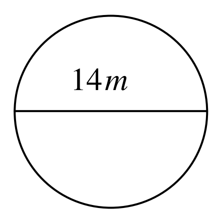


****Write in exponential form.**

12. $\log_4 256 = 4$

13. $\log_8 64 = 2$

****Write the equation in logarithmic form.**

14. $4^3 = 64$

15. $9^{\frac{2}{3}} \approx 4.327$

****Solve the equation for x.**

16. $\log_x 343 = 3$

17. $\log_6 x = -1$

18. $\log_2 256 = x$

19. $\log_2 (x+1) = 1$

****Expand the expression.**

20. $\log_8 12x^4$

21. $\log_3 8x$

22. $\log_4 \dfrac{13}{6}$

23. $\log_2 7x^{\frac{1}{2}}y^{\frac{2}{3}}$

****Condense the expression.**

24. $\log_3 13 - \log_3 5$

25. $6\log_4 13 - 5\log_4 2$

26. $\log_8 52 - 4\log_8 2$

27. $\log_3 9 + \frac{1}{2}\log_3 y$

ACT Prep Factoring

1. $x^3 + 3x^2 + 10x + 30$

2. $x^3 + 5x^2 - 4x - 20$

3. $x^3 + 64$

4. $3x^3 - 6x^2 + x - 2$

5. $2x^3 - 3x^2 - 2x + 3$

6. $27x^7 + 54x^4$

7. $x^4 - 81$

8. $81x^4 - 256$

9. $4x^4 - 5x^2 - 9$

10.

11, $4y^5 - 32y^2$

12. $32x^6 - 2x^2$

13. $6x^5 - 51x^3 - 27x$

14. $5x^4 + 40x$

****Solve.**

15. $5n - 3 = 7n + 7 + 3n$

16. $3(x-1) = 4x + 7 + x$

17. $\frac{3}{5}x - 8 \geq 12$

18. $|2x - 60| - 55 = 13$

19. $-3(x+3) = 4x - 7$

20. $-\frac{1}{4}(28x - 8) < 7x - 2$

21. $13x - 8 = 9 + 6x + 7x$

22. $2x - \frac{4}{7} = \frac{8}{9}$

23. $\frac{-x}{7} + 11 \geq 14$

24. $\frac{2}{3}x + \frac{3}{5} = \frac{x}{6} - \frac{2}{9}$

ACT Prep
Functions

****Find** $(f+g)(x),(f-g)(x),$ **and** $(f \bullet g)(x)$ **for each pair of functions.***

1. $f(x)=4x, g(x)=x-5$

2. $f(x)=2x, g(x)=x+8$

3. $f(x)=3x-2, g(x)=5x+1$

4. $f(x)=2x-4, g(x)=6x^2$

****Find** $\left(\frac{f}{g}\right)(x)$ **and** $\left(\frac{g}{f}\right)(x)$ **for each pair of functions. State their domains.***

5. $f(x)=3x+2, g(x)=2x+1$

6. $f(x)=5x-4, g(x)=x+3$

7. $f(x)=\sqrt{x-4}, g(x)=x^2$

8. $f(x)=\sqrt{x+2}, g(x)=3x^2$

*****Find** $(f \circ g)(x)$**, ** $(g \circ f)(x), (f \circ g)(4), and\ (g \circ f)(4)$ **for each pair of functions. State their domains.***

9. $f(x) = -2x^2, g(x) = 2x + 3$

*****Find** $(f \circ g)(x)$ **and** $(g \circ f)(x)$ **for each pair of functions. State their domains.***

10. $f(x) = \frac{3}{x}, g(x) = x^2 - 5$

11. $f(x) = \sqrt{x+2}, g(x) = 3x$

ACT Prep
Simplifying Expressions/Radicals

****Simplify each expression.**

1. $x^9 \bullet \frac{1}{x^4}$

2. $\frac{y^7}{3x^3} \bullet \frac{12x^{12}}{xy^5}$

3. $\frac{2x^2 - 11x - 6}{6x^2 + 11x + 4}$

4. $\frac{1}{2}(8n + 10m) - \frac{1}{3}(15n - 3m)$

5. $\frac{3x^3}{(-x)^2 y}$

6. $\frac{3x^5 - 9x^4 y + 6x^2 y^3}{3x^2}$

7. $\frac{6x^3 y - 12xy^3 - 15xy}{3xy}$

8. $(5x^2 y^3)^{-2}$

9. $\frac{4y^2 - 5y - 6}{8y^2 + 6y}$

10. $\frac{25c^2 - 36d^2}{10c^2 + 3cd - 18d^2}$

****Perform the indicated operations. Write answers in simplest form.**

11. $\dfrac{n+2}{n^2} \bullet \dfrac{3n}{n^2-4}$

12. $\dfrac{3x+3y}{x^2} \div \dfrac{x^2-y^2}{6x}$

13. $\dfrac{c^2-1}{16c} \bullet \dfrac{4c^2}{5c+5}$

14. $\dfrac{24}{x^2-8x+16} \div \dfrac{36}{x-4}$

****Simplify.**

15. $6\sqrt{3}+8\sqrt{3}$

16. $\dfrac{5-\sqrt{12}}{\sqrt{2}}$

17. $(\sqrt{3}-\sqrt{5})(\sqrt{3}+\sqrt{5})$

18. $\dfrac{1}{x^{\frac{-1}{6}}}$

19. $\sqrt[3]{-27}$

20. $\left(\dfrac{x^{-2}}{y^{-7}}\right)^{-3}$

21. $\left(8x + 2y - 16x^2\right)^0$

22. $\sqrt[5]{(4x^2 + 7)^7}$

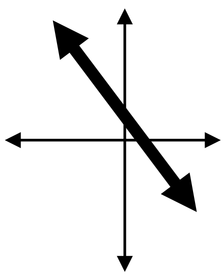
23. $\sqrt{x^2 - 12x + 36}$

24. $-\sqrt{144}$

ACT Prep
Slopes/Equations of a Line

****State whether the slope is *positive, negative, zero,* or *undefined.***

1.



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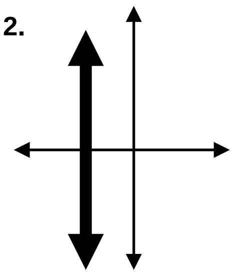

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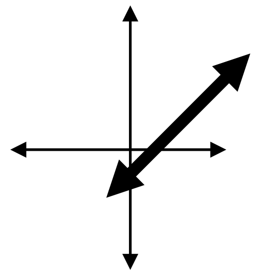


****Find the slope of the line passing through the given points.**

4. (1, 5) and (2, 9)

5. (2, 3) and (4, 3)

6. (2, 4) and (1, 1)

7. (6, -8) and (6, 4)

8. (5, 2) and (5, -3)

9. (4, 1) and (2, 7)

*****Find the slope, x-intercept, and the y-intercept for each line.***

10. $y = -3x - 4$

11. $y = \frac{1}{2}x + 6$

12. $5x - 10y = -40$

**Write the equation of the line using point-slope form. Write the equation in slope-intercept form.

13. $\left(-4,16\right), m = 8$

14. $\left(-12,-13\right), m = -\frac{1}{4}$

15. $\left(8,-6\right),\left(5,21\right)$

16. $\left(6,-5\right), m = -4$

17. $\left(6,-2\right),\left(10,1\right)$

18. $\left(-8,-9\right), m = 0$

19. Find the equation of the line that is parallel to the line $3x + y = 8$ and passes through the point (5, -2).

20. Find the equation of the line that is perpendicular to the line $y + 7 = 4x$ and passes through the point (6, -1).

****Find the coordinates of the vertex and give the equation of the line of symmetry.**

21. $y = x^2 - 3x - 10$

22. $y = 8x^2 - 5$

23. $-6x^2 - x + 2 = y$

24. $y = \frac{1}{4}x^2 - 10$

ACT Prep
Systems of Equations

****Set up a system of equations for each problem and solve.**

1. The sum of two numbers is 420 and their difference is 84. What are the two numbers?

2. Tonya was selected to be a contestant on a new game show. Tonya won $25 dollars for every correct answer she gave. She lost $35 for every incorrect answer she gave. She answered three times as many questions correctly as she did incorrectly. Tonya won $280. How many correct answers did Tonya give?

3. Reader High School sold 177 tickets for their last basketball game. Adult tickets sold for $5.00 and student tickets were $4. How many adult tickets were sold if the ticket sales totaled $831?

4. Maria is a cashier at Meijer's. At the end of the day, she had 63 $5 and $10 bills. The bills total $435. How many $5's and $10's does she have in her drawer?

**Solve each system.

6. $\begin{cases} 6x - 8y = 18 \\ 8x + y = 24 \end{cases}$

7. $\begin{cases} 1.5x - 2.5y = 8.5 \\ 6x + 30y = 24 \end{cases}$

8. $\begin{cases} 4y = 22 - 7x \\ -5x = 9y + 15 \end{cases}$

9, $\begin{cases} 8x - 2y = 12 \\ 16x - 4y = 16 \end{cases}$

10. $\begin{cases} 10x - 4y = 8 \\ 5x = 2y + 4 \end{cases}$

ACT Prep
Systems of Equations

****Solve each system.**

1. $\begin{cases} x - 3z = -2 \\ 3x + y - 2z = 5 \\ 2x + 2y + z = 4 \end{cases}$

2. $\begin{cases} x + y + z = 6 \\ 2x - y + z = 3 \\ 3x - z = 0 \end{cases}$

3. $\begin{cases} x + 4y + z = 12 \\ y - 3z = -7 \\ z = 3 \end{cases}$

4. $\begin{cases} x - y + 2z = 15 \\ -2x + 2y - 3z = -25 \\ y + 2z = 9 \end{cases}$

5. $\begin{cases} x - y - 3z = 1 \\ x - z = -4 \\ 3x = -15 \end{cases}$

6. $\begin{cases} x + 9y + z = 20 \\ x + 10y - 2z = 18 \\ 3x + 27y + 2z = 58 \end{cases}$

7. $\begin{cases} 2x - 4y + 2z = 20 \\ x + 10y - 2z = 18 \\ 3x + 27y + 2z = 58 \end{cases}$

8. $\begin{cases} -x + y - 3z = -4 \\ 3x - 2y + 8z = 14 \\ 2x - 2y + 5z = 7 \end{cases}$

ACT Prep
Triangles/Trig

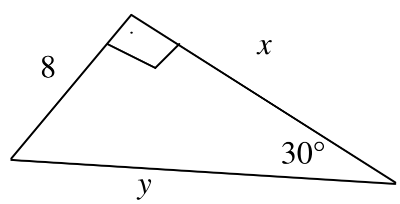
****Determine whether the numbers can represent the side lengths of a triangle. If they can, classify the triangle as *right, acute,* or *obtuse*.**

1. 15, 36, 39

2. 7, 9, 12

****Find the value of each variable in each right triangle. Write answers in simplest radical form.**

3.



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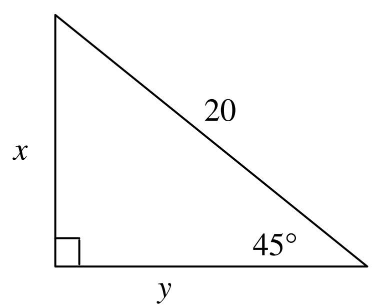

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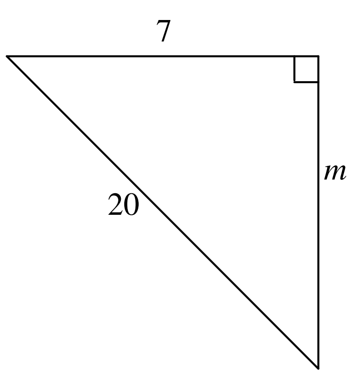

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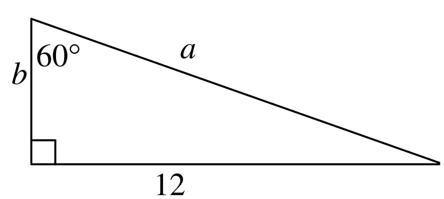

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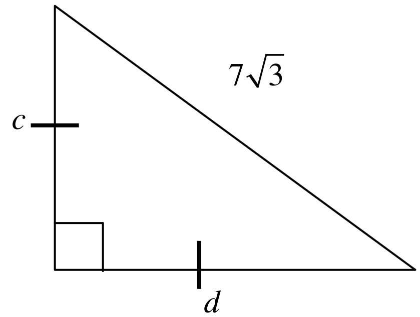

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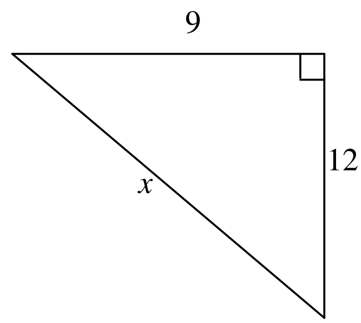
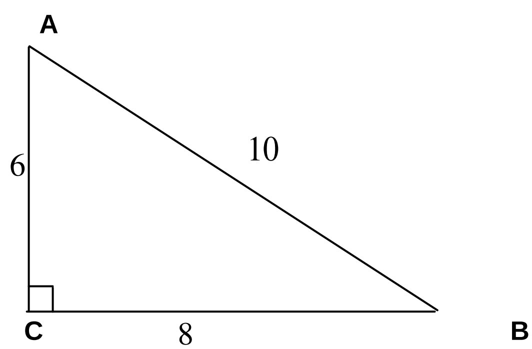


****Use the diagram below to answer questions 9-14.**



9. Find $\sin A$

10. Find $\cos B$

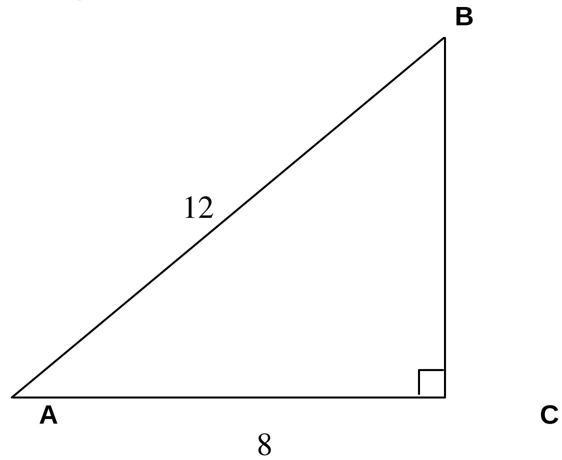
11. Find $\tan B$

12. Find $\sin B$

13. Find $\cos A$

14. Find $\tan B$

****Use the diagram below to answer questions 15-16.**

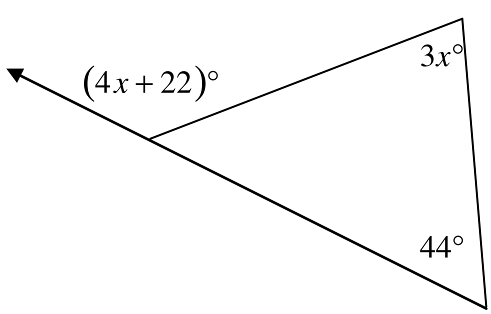


15. $\sin A$

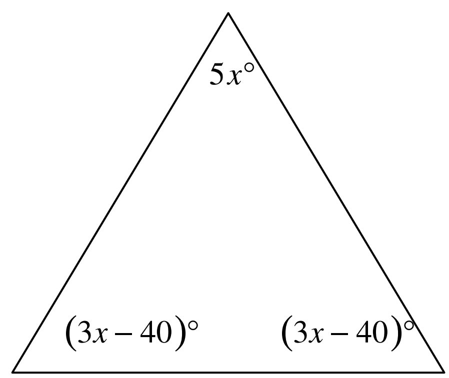
16. $\tan B$

****Find the value of x.**

17.



18.



Function Unit

Family of Functions Unit

Day 1	Day 2	Day 3	Day 4	Day 5
Mother Functions & their offspring guided inquiry	Introduce Project Smiley Go over basic programming/ calculator usage. Students brainstorm picture	Practice giving function draw picture and state modifications	Practice giving graph and write equation	Give dilations/trans-lations of generic functions Quiz
Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Assessment	Work on Project Smiley Due one week after first work day in class	Work on Project Smiley	Lesson on Domain and Range - pictorially	Lesson on Domain and Range – looking at equations
Day 11	**Day 12**	**Day 13**	**Day 14**	**Day 15**
Quadratic Functions – vertex, max, min, intercepts	Continue practice day 11 material Quiz	Solving Quadratics – factoring, completing the square, quadratic formula	Continue practice day 13 material	Assessment Gateway Arch
Day 16	**Day 17**	**Day 18**	**Day 19**	**Day 20**
Moscow Arch problems Golden Gate Bridge Problem	Complex Numbers – how it relates to graph and basic operations	Complex numbers operation continued	Quadratics with complex solutions – quadratic formula and completing the square	Assessment over Complex numbers
Day 21	**Day 22**	**Day 23**	**Day 24**	**Day 25**
Review	Test			

Function Unit	Day 1

Daily Objective	*Learn Mother Functions and How They Move*	Ohio Content Standards	
		K-8-10	Geometry and Spatial Sense (F)
		K-8-10	Patterns, Functions and Algebra (B, D, E, G)
Materials Needed	Graphing Calculator	K-8-10	Mathematical Processes (A,B,C, F, G)
	Colored pens/pencils	K-8-10	Number, Number Sense and Operations (I)
		K-11-12	Number, Numbers Sense and Operations (E)
		K-11-12	Patterns, Functions and Algebra (A, B)
		K-11-12	Mathematical Processes (A, E, H, I)

Activities	Time Allotted
1. Mother Functions and their offspring guided inquiry .	45 min

Journal Prompt	Assessment

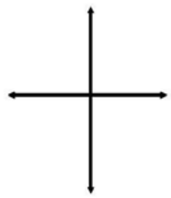
Notes

Mother functions & their offspring **June 18, 2008**

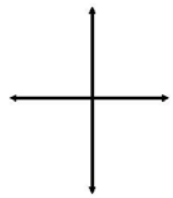
Show Me Your Moves!

Draw your mother functions below!
Accurately plot an appropriate number of points for each type of graph.

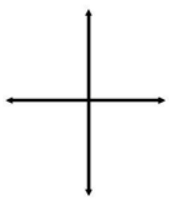
$y = x$



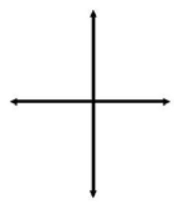
$y = |x|$



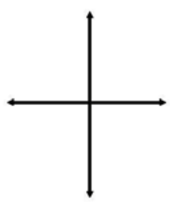
$y = x^2$



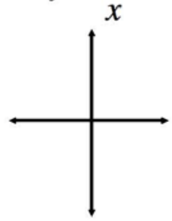
$y = x^3$



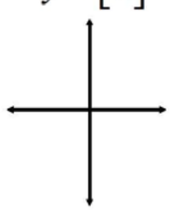
$y = \sqrt{x}$



$y = \dfrac{1}{x}$

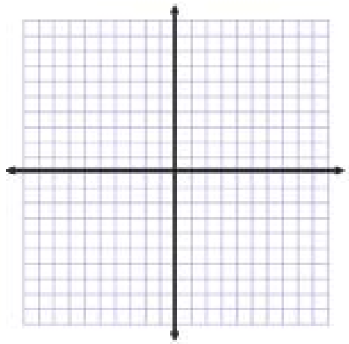


$y = [x]$

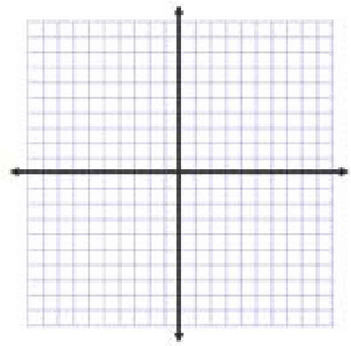


Go back and draw (in a different color) the negative version of each graph.
i.e. y = x, y = x^2, etc.

Graph $y = x^2$
and $y = x^2 + 2$
on the axis below

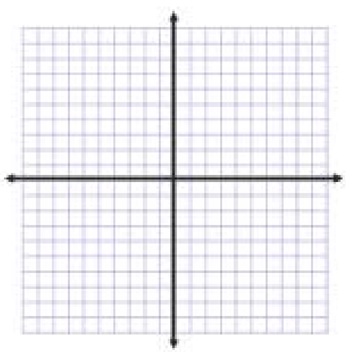


Graph $y = x^2$
and $y = (x + 2)^2$
on the axis below

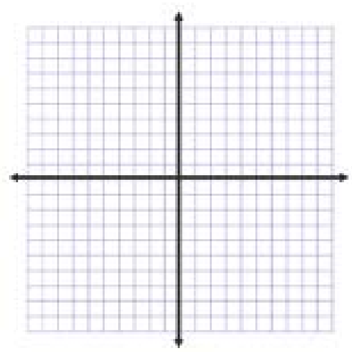


Describe the changes that took place.

Graph $y = x^2$
and $y = x^2 - 2$
on the axis below



Graph $y = x^2$
and $y = (x - 2)^2$
on the axis below



Describe the changes that took place.

Let's write the general observations:

A graph moves UP if ...

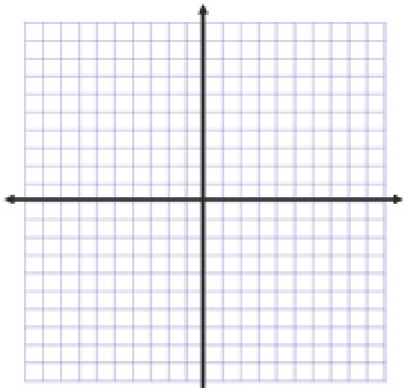
A graph moves DOWN if ...

A graph moves RIGHT if ...

A graph moves LEFT if ...

Graph the following on the axis below.

$y = |x|$ $y = 3|x|$ $y = \frac{1}{3}|x|$



Describe the changes that took place.

The graph gets 'tall' if ...

The graph gets 'broad' if ...

Tom and Jill are discussing the graph of $y = 3|x|$.
Tom said "The graph gets thin."
Jill argues, "no, the graph gets tall."

Who's right? And Why?

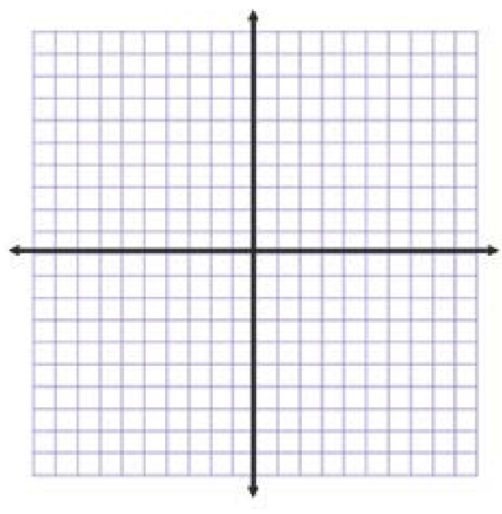
Describe how each graph is modified based on its mother, f (x).

$$f(x) = x^2$$

$$g(x) = x^2 - 4$$

$$h(x) = (x+2)^2 + 1$$

Sketch the graphs below by hand using your observations! Sketch on one graph and use different colors.



Function Unit				Day 2
Daily Objective	*Programming Calculator Usage*	**Ohio Content Standards**		
Materials Needed	Graphing Calculator			

Activities	**Time Allotted**
1. Introduce Project Smiley 2. Go over programming/calculator usage 3. Student brainstorm picture to create	45 min

Journal Prompt	Assessment

Notes

Content covered:

Families of functions
Graphing of all functions
Graph quadratic functions
Determine domain

Project Smiley: Using Basic Graphs and Transformations to Draw Pictures

The purpose of this project is for you to program your calculator to draw a picture that incorporates many of the "basic graphs" that we have studied in class as well as your knowledge of transformations (vertical shifts, vertical stretches and shrinks, horizontal shifts).
You will write a program to draw the picture.

<u>Here is a list of the Basic Graphs that you can/must use:</u>

1. y = mx + b	linear equation
2. $y = \lvert x \rvert$	absolute value
3. $y = x^2$	parabola (quadratic)
4. $y = x^3$	cubic
5. $y = \frac{c}{x}$	reciprocal
6. $y = \sqrt{x}$	square root
7. $y = [x]$	greatest integer (step)
8. $y = b^x$	exponential

Requirements:

1. 3 different "Basic Graphs" makes you eligible for a 'C'
2. 5 different "Basic Graphs" makes you eligible for a 'B'
3. 7 different "Basic Graphs" makes you eligible for an 'A'
4. 8 different "Basic Graphs" makes you eligible for bonus points
5. You must use some sort of transformation on at least 90% of your functions
6. You must use ***restricted domains*** (for example: DrawF (2x+3)/(x>5)) on at least 80% of your functions (see the explanation for restricted domains later in this document)
7. You must have a minimum of 10 DrawF statements in your program
8. You may not use any other Draw commands except the DrawF command
9. Your picture must be recognizable
10. Bonus points can also be earned for extra creative drawings as perceived by the teacher

<u>What You Will Turn In When Finished</u>

1. A "hand drawn" sketch on graph paper of your picture drawn before your calculator picture was constructed.
2. Print out of a picture that you wanted to have your calculator "draw".
3. A paragraph explaining what your picture is.
4. Copy of program (written or typed).
   Next to each DrawF line, it must contain:
   a) Description – type of mother function
   b) How it relates to the picture
5. A paragraph discussing the following:

a) What you liked about this project
b) What you disliked about this project
c) What you learned while doing this project
d) What problems that you encountered while doing this project
e) Any other comments you would like to share

Helpful Hints

1. ***Restricted domains*** If you want to graph only a portion of a function, you may do so by placing restrictions at the end of the expression. Note that the restrictions are always preceded by a division forward slash: / , and that the restrictions must be enclosed by parentheses.
For example, if you want to graph a parabola for values of x greater than 2, you would type the following:

DrawF $(x^2)/(x>2)$ *Note:* the > and < signs are found at 2nd MATH, which is TEST.
Or if you would like to draw a parabola from 1 to 3, you would type the following:
DrawF $\left(-.5(x-2)^2+3\right)\left(x<3\ and\ x>1\right)$

Note: the 'and' is found at 2nd MATH ⟩, which is LOGIC. NOTE: do not type the word 'and', the calculator will not recognize it as the word 'and'.

2. Use a *convenient and square window* to develop your picture.
One possibility: Xmin = - 9.4, Xmax = 9.4, Ymin = -6.2, Ymax = 6.2 (Xscl and Yscl's don't matter here because you will be turning off the axes anyhow)
2^{nd} possibility: Xmin = 0, Xmax = 9.4, Ymin = 0, Ymax = 6.2 (Xscl and Yscl's don't matter here either). Another rule of thumb is that the ratio of x to y is 3 to 2 (approximately) to be a square window.

<u>**To Enter the Program Into Your Calculator**</u>

1. Press the PRGM key on your calculator; select NEW: EXEC EDIT NEW 1:Create New to create a new Program
2. For the name of the program: use the first three letters of your first name and the first three letters of your last name: PROGRAM Name=TOMREA

3. 1^{st} line of program: 2nd PRGM, which is DRAW, select 1: DRAW POINTS STO 1:ClrDraw to clear any drawings that may have been there before.

4. Notice that each time you hit ENTER, you get a new command line. Each new command line begins with a colon **:**

5. 2^{nd} line of program: Axes Off. To obtain this: 2nd ZOOM, which is FORMAT.

Select AxesOff by pressing ENTER. Then ENTER again to obtain a new command line.

6. 3^{rd} line of program will turn off any functions in the y= menu (we don't want them to graph):

VARS) 4 2, which is VARS, Y-VARS, 4:On/Off, 2:FnOff

So far:

```
PROGRAM:TOMREA
:ClrDraw
:AxesOff
:FnOff
:
```

7. 4th line of program will turn off any Plots that you might have on:

2nd

8. Next set the window that you want to use and you have several options. Go back and reread <u>2: Use a *convenient and square window* to develop your picture</u> located on page 2.

For this example I will use this window: $-9.4 \le x \le 9.4$ *and* $-6.2 \le y \le 6.2$

(−) 9 . 4 STO▸ VARS 1 1, which means – 9.4 will be stored into VARS, 1:Window, 1:Xmin. It will look like this on the screen: `: -9.4→Xmin`

Follow a similar pattern to obtain the rest of the window as shown below:

```
PROGRAM:TOMREA
:FnOff
:PlotsOff
: -9.4→Xmin
:9.4→Xmax
: -6.2→Ymin
:6.2→Ymax
:
```

9. You are now ready to enter your functions using the DRAW menu, DrawF command:

2nd PRGM 6. Notice that you never type in y or the = key when using the DrawF command.

Additional Programming Hints:

- Use CLEAR to clear a line from your program that you do not like
- Use 2nd DEL ENTER to insert a blank line into the program
- NOTE: you can have several blank lines in your program. It is even a good idea to have blank lines to serve as "separators" so that you can read your program more easily.
- When you want to leave the program as you are writing it, 2nd MODE to quit. The program is automatically saved with any changes you made to it.
- Put the equation into the y= menu and graph it to make sure it is what you want before putting it into the program
- If you wish to change or edit a program that you already have named, from the home screen type: PRGM, arrow (cursor) over to EDIT, then arrow (cursor) down to the name of the program that you want to change (it must be done in this specific order):

```
EXEC EDIT NEW
1:BALLDAT1
2:BALLDAT2
3:BALLDAT3
4:CAR
5:PICASSO
6:TOMREA
```

Hit .

Then arrow (cursor) inside the program to where you wish to make changes.

The following is a short program that you can use as a model. The *convenient and square window* that is being used here is: $-9.4 \le x \le 9.4$ and $-6.2 \le y \le 6.2$
This program is going to draw this “face.”

Comments:

```
PROGRAM:FACE
:ClrDraw
:AxesOff
:FnOff
:PlotsOff
: -9.4→Xmin
:9.4→Xmax
:6.2→Ymax
:DrawF (.5√(X-2)
+3)/(1<X and X<3
)
:DrawF (.5√(-(X+
2))+3)/(-1>X and
:
:DrawF (.25X²-3)
/(-3<X and 3>X)
:
:DrawF (-abs(X)+
2)/(-1<X and X<1
)
```

This radical creates the right eyebrow

This radical creates the left eyebrow

This parabola creates the smile

This absolute value creates the nose

Function Unit		**Day 3**
Daily Objective	*Draw graph state changes*	

Ohio Content Standards

Materials Needed

Activities	**Time Allotted**
Give students a function Make them state changes from Mother Function and draw graph by hand Continue this type of practice	45 min

Journal Prompt	Assessment

Notes

Function Unit			Day 4
Daily Objective	*Write equation from graph*	**Ohio Content Standards**	
Materials Needed			

Activities	**Time Allotted**
1. Give students a graph from the basic Mother Functions and make them write the equation	45 min

Journal Prompt	Assessment

Notes

Function Unit				Day 5
Daily Objective	*Understand function movement*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Give dilations/translations of generic functions w.s.	45 min

Journal Prompt	Assessment

Notes

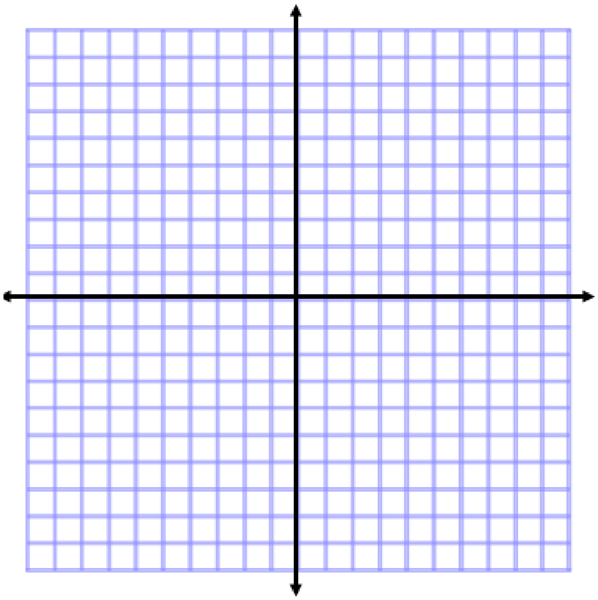
Dilations/Translations

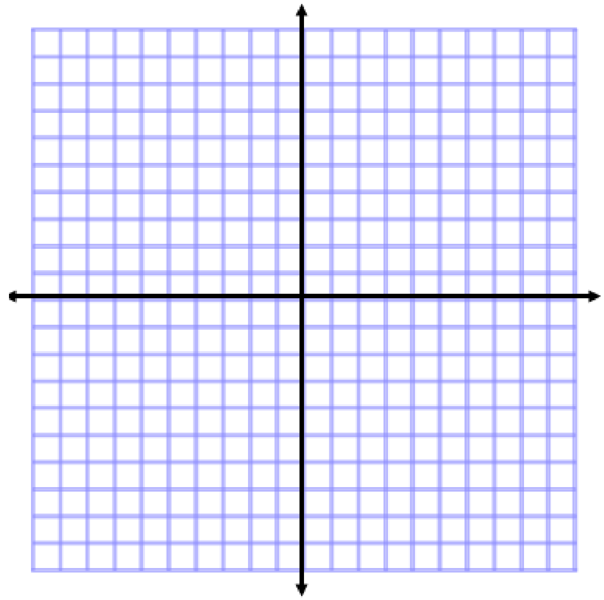
Name________________________________

For each of the following sketches of $y = f(x)$, briefly describe the effects of all constants and negative signs. Then sketch each dilation and/or translation on the same coordinate axes. The first one is done for you.

1. $y = f(x+3) - 1$

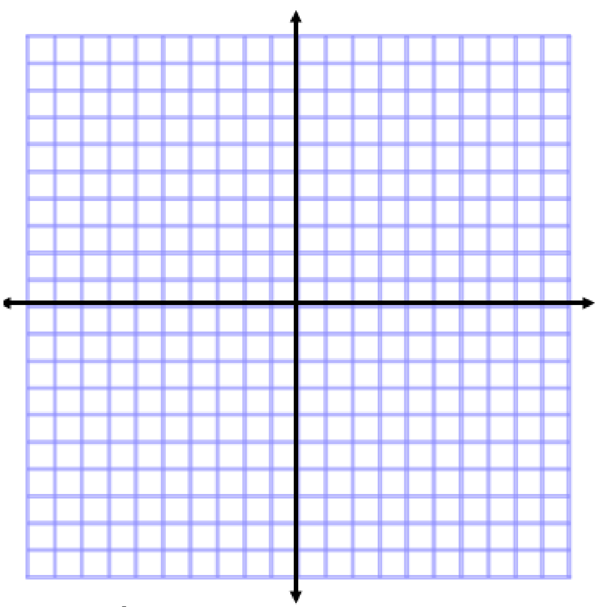
2. $y = f(2x)$

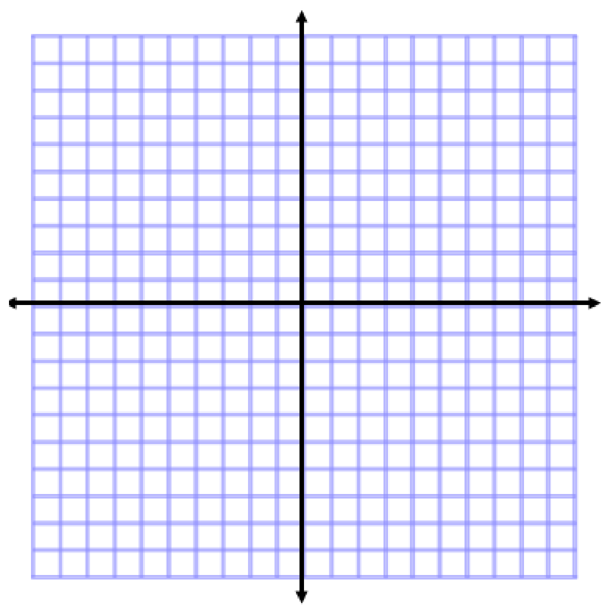




3. $y = f(-x) + 3$

4. $y = \frac{1}{3} f(x)$





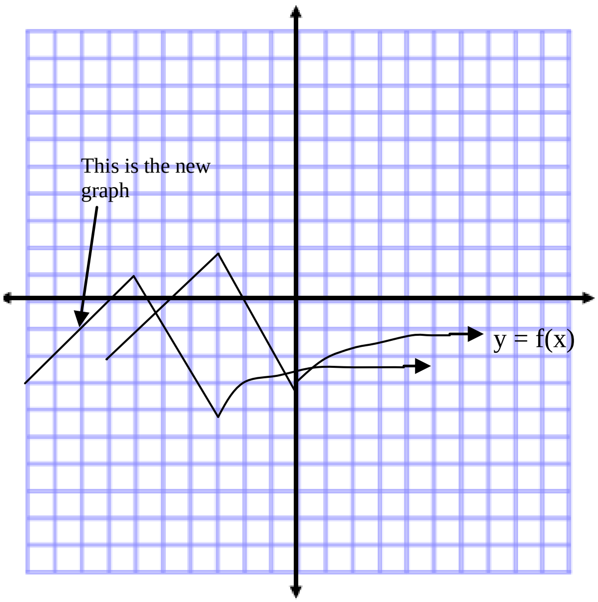
Dilations/Translations Name_______________________________

For each of the following sketches of $y = f(x)$, briefly describe the effects of all constants and negative signs. Then sketch each dilation and/or translation on the same coordinate axes. The first one is done for you.

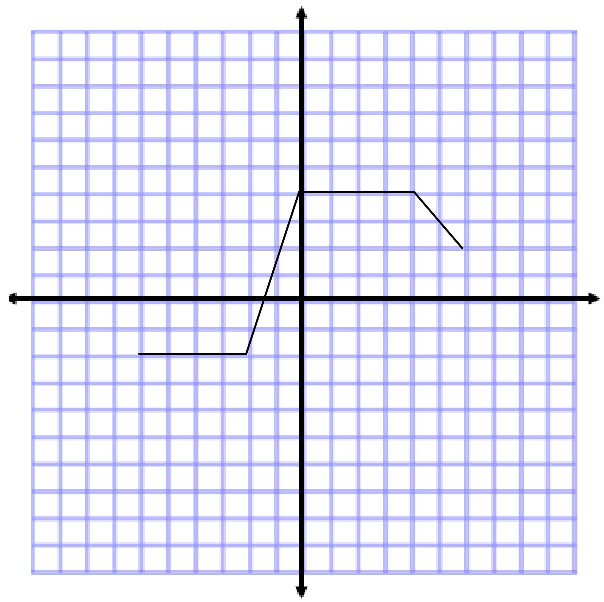
1. $y = f(x+3) - 1$

left 3

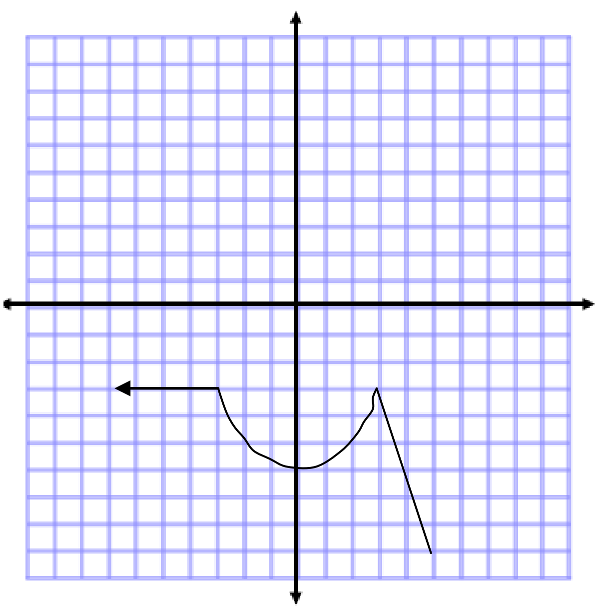
down 1



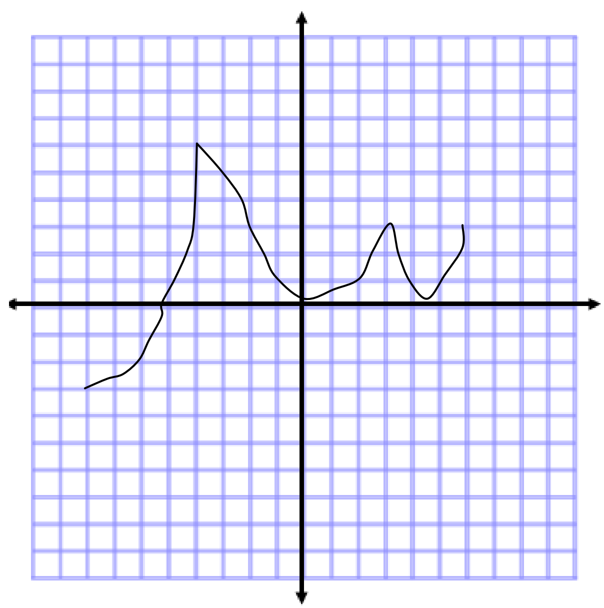
2. $y = f(2x)$



3. $y = f(-x) + 3$



4. $y = \frac{1}{3} f(x)$

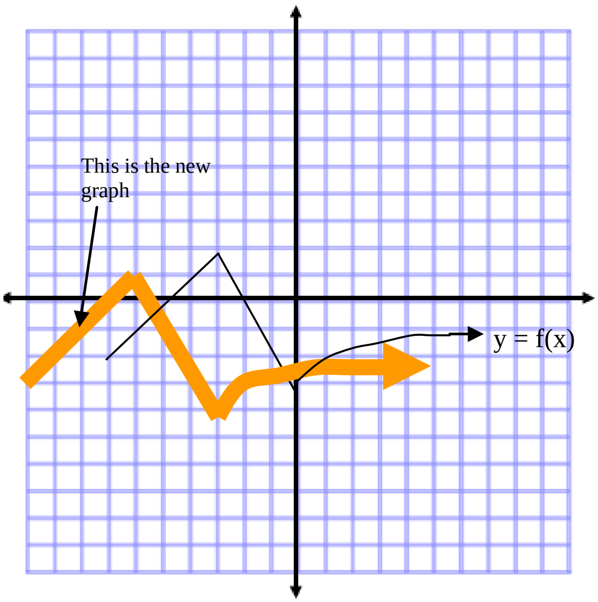


Dilations/Translations Name KEY KEY

For each of the following sketches of $y = f(x)$, briefly describe the effects of all constants and negative signs. Then sketch each dilation and/or translation on the same coordinate axes. The first one is done for you.

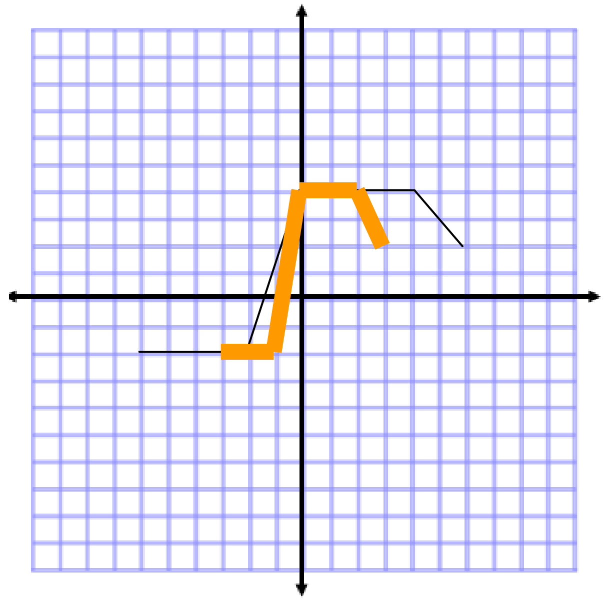
1. $y = f(x+3) - 1$

left 3 down 1



2. $y = f(2x)$

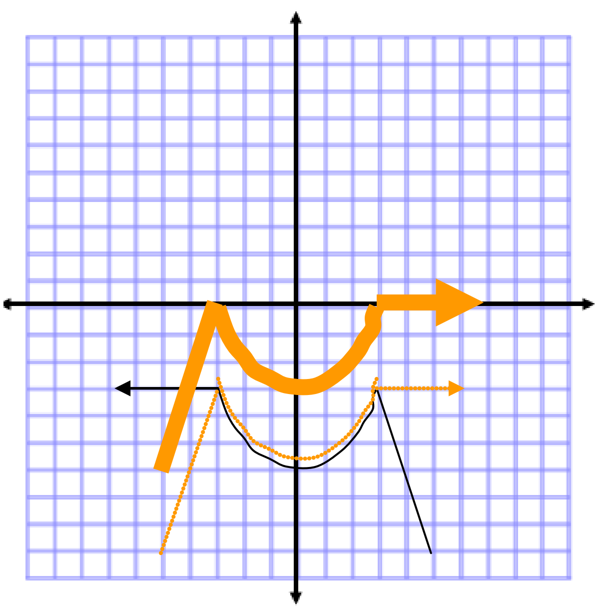
divides x's by 2
(shrinks horizontally)



3. $y = f(-x) + 3$

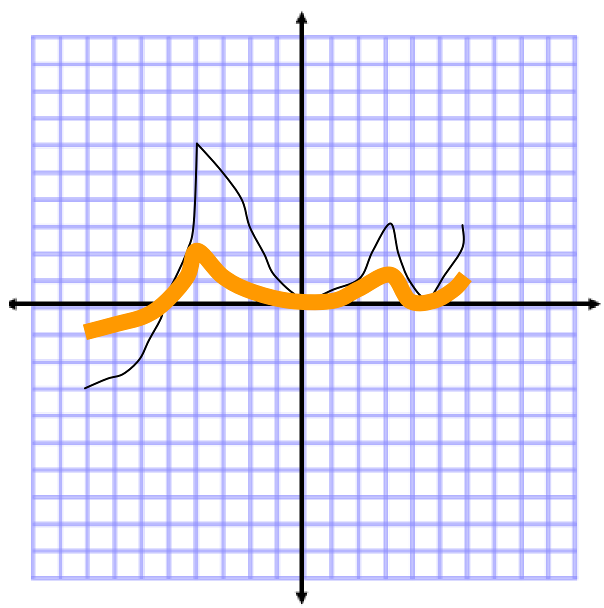
affects y, up 3

affects x
flips left/right



4. $y = \frac{1}{3} f(x)$

affects y
divides y's by 3
(shrinks vertically



Function Unit	**Day 6**

Daily Objective	*Assessment*	**Ohio Content Standards**	
Materials Needed			

Activities	**Time Allotted**
1. Assessment over days 1-5 2. Students work on Project Smiley with extra time	35 -40 min

Journal Prompt	Assessment

Notes

Function Unit				Day 7- 8
Daily Objective	*Project Smiley*	**Ohio Content Standards**		
Materials Needed	Graphing Calculator			

Activities	**Time Allotted**
1. Work on Project Smiley. Have due a week from 1st work day.	2-45 min

Journal Prompt	Assessment

Notes

Function Unit	Day 9-10

Daily Objective	*Find Domain and Range*	Ohio Content Standards	
Materials Needed			

Activities	Time Allotted
Day 9 – Find domain and range pictorially	45 min
Day 10 – Find domain and range given equation	45 min

Journal Prompt	Assessment

Notes

Function Unit	Day 11-12

Daily Objective	*Quadratic Function Characteristics*	Ohio Content Standards	
Materials Needed			

Activities	Time Allotted
Quadratic Functions Find vertex, max, min, intercepts of functions written in different notation i.e. ax2 + bx +c and (x-d)2	45 min

Journal Prompt	Assessment

Notes

Function Unit		Day 13-14
Daily Objective	*Solve Quadratics*	

Materials Needed	

Ohio Content Standards	

Activities	Time Allotted
Solve quadratics using factoring, completing the square and quadratic formula. On second day use calculator to simplify radical form	2 - 45 min classes

Journal Prompt	Assessment

Notes

Function Unit				Day 15
Daily Objective	*Assessment*	**Ohio Content Standards**		
Materials Needed	Calculators optional			

Activities	**Time Allotted**
Assessment over days 9-14 Students start Gateway Arch finish HW	35 - 40 min

Journal Prompt	Assessment

Notes

Function Unit	Day 16

Daily Objective	*Applying Quadratics*

Ohio Content Standards	

Materials Needed	Calculator

Activities	Time Allotted
Go over Gateway Arch Do Moscow Arch and Golden Gate Bridge Problems	45 min

Journal Prompt	Assessment

Notes

The Golden Gate Bridge Problem

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The Golden Gate Bridge is one of the largest and most spectacular suspension bridges in the world. The total length of the bridge is almost 9000 feet and it took 4 years to build, completed in 1937, at a cost of $35.5 million. The bridge has two towers that hold up two steel cables (36.5 inches in diameter) from which the bridge hangs. These supporting cables approximate the shape of a parabola with the lowest point reaching about 6 feet above the floor of the bridge and the cable attached to the top of the tower at a height of 496 feet above the floor. The section between the towers is 4200 feet long, one of the world's longest spans.

With this information, answer the following:

1. Generate a quadratic equation whose graph best models the shape of one of the cables.

2. Using the equation found in part (1), predict the height of the cable above the floor of the bridge when a car is 500 feet from either tower. (answer to the nearest inch)

3. If a car is at a spot on the bridge where the cable is 300 feet above it, how far is the car from each tower? (answer to the nearest inch)

The Gateway Arch Problem

On a trip to St. Louis you visit the Gateway Arch. Since you have time on your hands, you decide to estimate its altitude. You measure the distance across the base of the arch to be 162 m. You also measure a height of 4.55 m when you are 1 m away (horizontally) from the bottom of the arch. NOTE: The arch is a parabola.

a) Find the equation of the underside of the arch.
b) Find the height of the arch.
c) An airplane with a wingspan of 40 m tries to fly through the arch at an altitude of 170 m. Can the plane make it? Justify your answer.

The Moscow Arch Problem

On a trip to Moscow you visit the Moscow Arch. Since you have time on your hands, you decide to estimate its altitude. You measure the distance across the base of the arch to be 174 m. You also measure a height of 9.5 m when you are 2 m away (horizontally) from the bottom of the arch. NOTE: The arch is a parabola.

a) Find the equation of the underside of the arch.
b) Find the height of the arch.
c) An airplane with a wingspan of 65 m tries to fly through the arch at an altitude of 180 m. Can the plane make it? Justify your answer.

Function Unit	Day 17-18

Daily Objective	*Understand Complex Numbers*	Ohio Content Standards	
Materials Needed			

Activities	Time Allotted
Explain how complex numbers relate to graph and teach basic operations	45 min 2 days 45 min. each

Journal Prompt	Assessment

Notes

Function Unit				Day 19
Daily Objective	*Solve Quadratics with Complex Numbers*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
Solve Quadratics with complex solutions – quadratic formula and completing the square	45 min

Journal Prompt	Assessment

Notes

Function Unit				Day 20
Daily Objective	*Assessment*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
Assessment over complex numbers Give review for a test go over tomorrow	30 min

Journal Prompt	Assessment

Notes

Function Unit	Days 21-22

Daily Objective	*Review for Test*	**Ohio Content Standards**
Materials Needed		

Activities	Time Allotted
Day 21 – go over review – Use “Function Information”	45 min.
Day 22 – Test	45 min

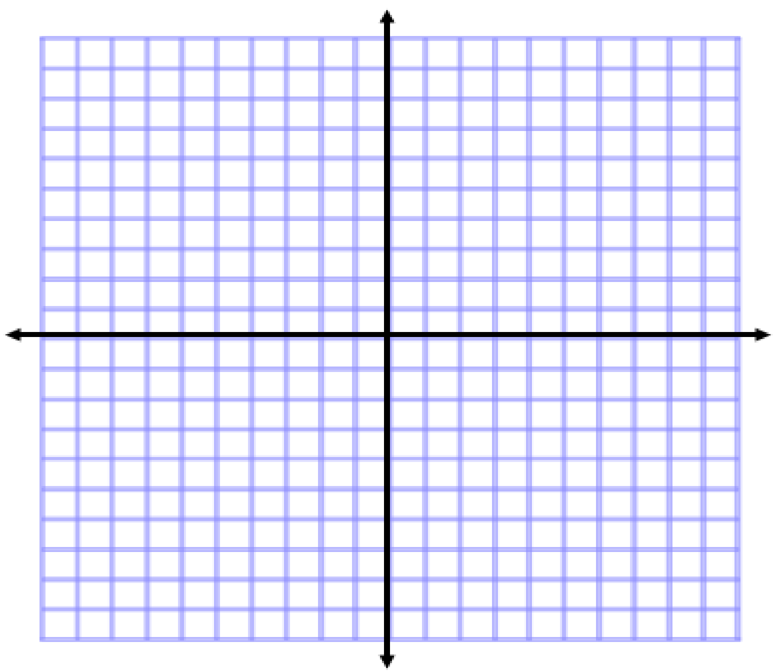
Journal Prompt	Assessment

Notes

Function Information
Name_______________________________

Answer each of the following questions based on the graph of $y = f(x)$ shown below.

1. Find the domain.
2. Find the range.
3. Find all the zeros.
4. How many solutions are there to $f(x) = 6$?
5. How many solutions are there to $f(x) = 0$?
6. What are the x-intercepts?
7. What are the y-intercepts?
8. On what interval(s) is the function increasing?
9. On what interval(s) is the function decreasing?
10. On what interval(s) is the function constant?
11. How many solutions are there for $f(x) = \frac{2}{3}x + 4$?
12. On what interval(s) is $f(x) < 0$?
13. At what value(s) of x does f have relative minima?
14. At what value(s) of x does f have relative maxima?



Polynomials and Rational Unit

Day 1	Day 2	Day 3	Day 4	Day 5
Box Project (introduces cubic)	Finish Box Project	Solving (factored form) polynomial equations – use finding zeros, multiplicity and number line analysis to graph by hand	Solving (factored or easily factored) polynomial equations – use finding zeros, multiplicity and number line analysis to graph by hand	Quiz
Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Tech synthetic and polynomial division to discover rational roots	Continue day 6 lesson	Graphing polynomial equations (using division to find roots and graph by hand)	Quiz	Name my function – give graph and students write equation
Day 11	**Day 12**	**Day 13**	**Day 14**	**Day 15**
Fundamental theorem of Algebra – finding all real and non real roots	Continue day 11 material	Continue day 11 material	Quiz	Solve rational equations – reciprocal functions and more complex
Day 16	**Day 17**	**Day 18**	**Day 19**	**Day 20**
Solve rational equations – more complex	Assessment Graph rational functions – find asymptotes, intercepts, end behavior, number line analysis	Continue day 17 material	Slant asymptotes. More graphing!	Quiz Review
Day 21	**Day 22**	**Day 23**	**Day 24**	**Day 25**
Polynomial Review	Test			

Polynomials Unit				Days 1-2
Daily Objective	*Introduce to Polynomial Functions*	**Ohio Content Standards**		
		K-8-10	Measurement (B)	
		K-8-10	Patterns, Functions and Algebra (A, B, D, E)	
Materials Needed	Graphing Calculator	K-8-10	Mathematical Processes (A, B, C, F)	
	Construction Paper	K-11-12	Patterns, Functions and Algebra (A, B)	
	Rulers	K-11-12	Mathematical Processes (H, I)	
	Scissors			

Activities	**Time Allotted**
1. Introduce Box Project. Explain objectives, divide class into groups	10 min
2. Students work on project in groups to construct open-top boxes by cutting squares from each corner of construction paper. They measure length, width, height and calculate volume. .	35 min
3. They continue following directions on project to develop graph and equation of cubic.	45 min

Journal Prompt	Assessment

Notes

Box Project (content covered)
Introduction to function notation
Determine Domain and Range
Distinguish on what intervals a function is increasing, decreasing, or constant
Graph quadratic functions
Apply algebraic functions to problem solving situations

Part 1 Making boxes to determine volume size
Essential Question: What size square to do you cut out to maximize the volume?

Break into groups of 3 to 4
Materials: 10 pieces of construction paper per group, rulers, scissors

Each groups needs to take out different size squares, constructing ten open top boxes and fill in the following chart.

Size of Square (cm)	Length	Width	Height	Volume (cm^3)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

1. Based on your essential question, what are your independent and dependent variables?

2. Considering your essential question, what is your relevant domain and why?

3. Considering your essential question, what is your relevant range and why?

4. Based on your models, approximately what size square should you take out to maximize your volume?

5. Now graph the points on your calculator.

6. What model best represents this graph?

7. Provide a function using proper notation that relates the independent and dependant variables.

8. Now graph your equation to see if it matches your data points.

9. What are the reasons you may have discrepancies?

10. Based on your equation, on what intervals is this function increasing and decreasing? And explain this using your models.

11. In paragraph form, answer the essential question and explain how you reached your conclusion.

Polynomials Unit				Day 3
Daily Objective	*Solving polynomial equations by graphing*	**Ohio Content Standards**		
Materials Needed	Graph paper			
	(no calculator)			

Activities	**Time Allotted**
1. Given factored polynomials [such as $f(x) = (x-2)(x+3)^2 (x-1)$] students will sketch a graph by hand by finding zeros, determining multiplicity and using number line analysis	
2. Teacher examples	15 min
3. Guided practice	25 min
4. Assign practice problems for homework	5 min

Journal Prompt	Assessment

Notes

Polynomials Unit				Day 4
Daily Objective	*Solving polynomial equations by graphing*	**Ohio Content Standards**		
Materials Needed	Graph paper			
	(no calculator)			

Activities	**Time Allotted**
1. Review of homework	10 min
2. Teacher examples of graphing polynomials in standard form (Factor, find zeros, determine multiplicity and end behavior, number line analysis, sketch graph)	15 min
3. Guided practice	20 min
4. Assign homework	

Journal Prompt	Assessment

Notes

Polynomials Unit				Day 5
Daily Objective	*Graphing polynomials*	**Ohio Content Standards**		
Materials Needed	Graph paper			
	(no calculator)			

Activities	**Time Allotted**
1. Review homework	10 min
2. Quiz over days 1-4	30 – 35 min

Journal Prompt	Assessment

Notes

Polynomials Unit				Day 6
Daily Objective	*Synthetic and Polynomial Division*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Review Quiz	10 min
2. Teacher examples of polynomial long division	15 min
3. Guided practice	20 min
4. Assessment	

Journal Prompt	Assessment

Notes

Polynomials Unit				Day 7
Daily Objective	*Synthetic Division*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Review homework	10 min
2. Teacher examples of synthetic divisions	10 min
3. Guided practice	20 min
4. Assessment	5 min

Journal Prompt	Assessment

Notes

Polynomials Unit	Day 8

Daily Objective	*Graphing polynomials*

Ohio Content Standards	

Materials Needed	
	Graph paper

Activities	Time Allotted
1. Review homework	10 min
2. Teacher lecture on rational zero test. Examples	15 min
3. Guided practice – use Rational Zero Test and divisions to find a zero of the polynomial	20 min
4. Graph by hand	5 min
5. Assessment	

Journal Prompt	Assessment

Notes

Polynomials Unit				Day 9
Daily Objective	*Polynomial and Synthetic Divisions*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Review homework	15 min
2. Quiz on synthetic division, long division and using Rational Zero Test to determine zeros of polynomials	30 min

Journal Prompt	Assessment

Notes

Polynomials Unit				Day 10
Daily Objective	*Using Zeros to write equation of polynomial*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Review Quiz	10 min
2. Send students to board. Teacher shows graph, students use x and y –intercepts to write an equation that is appropriate "Name My Function"	25 min
3. Homework	5 min

Journal Prompt	Assessment

Notes

Polynomials Unit				Days 11 - 13
Daily Objective	*Fundamental Theorem of Algebra*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Teacher lecture on Fundamental Theorem of Algebra. Using Rational Zero Test to determine zero(s). Algebraically solve to find all zeros (real and non-real) 2. Guided practice 3. Assessment	20 min 25 min

Journal Prompt	Assessment

Notes

Continue practice on days 12 and 13

Polynomials Unit				Day 14
Daily Objective	*Solving Polynomial Equations Algebraically*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Review	10 min
2. Quiz – Fundamental Theorem of Algebra and solving polynomial equations for all roots	35 min

Journal Prompt	Assessment

Notes

Continue practice on days 12 and 13

Polynomials Unit				Days 15 & 16
Daily Objective	*Solve Rational Equations*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Review quiz	15 min
2. Teacher examples – solve rational equations – simple reciprocal and more complex	15 – 20 min
3. Guided practice	10 min

Journal Prompt	Assessment

Notes

Continue to day 16

Polynomials Unit				Days 17 & 18
Daily Objective	*Graph rational functions*	**Ohio Content Standards**		
Materials Needed	Graph paper			

Activities	**Time Allotted**
1. Short assessment on solving rational equations algebraically	15 – 20 min
2. Teacher examples of graphing rational expressions – find asymptotes, intercepts, end behavior, number line analysis	20 min
3. Guided practice	30 min
4. Assessment	

Journal Prompt	Assessment

Notes

Continue onto day 18

Polynomials Unit				Day 19
Daily Objective	*Slant asymptotes*	**Ohio Content Standards**		
Materials Needed	Graph paper			

Activities	**Time Allotted**
1. Examples: Use polynomial/synthetic division to find equation of slant asymptotes. Graph rational functions with slant asymptotes.	20 min
2. Guided practice	25 min
3. Assessment	

Journal Prompt	Assessment

Notes

Polynomials Unit	Day 20

Daily Objective	*Graphing Rational Functions*	**Ohio Content Standards**	
Materials Needed	Graph paper		

Activities	**Time Allotted**
1. Review	10 min
2. Quiz on rational function graphs and asymptotes	20 – 30 min
3. Assign unit review as homework	

Journal Prompt	Assessment

Notes

Polynomials Unit				Days 21 & 22
Daily Objective	*Polynomial review*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Review quiz. Review unit	45 min
2. Unit test	45 min

Journal Prompt	Assessment

Notes

Exponent & Logarithmic Functions

Day 1	Day 2	Day 3	Day 4	Day 5
Inverse 1 to 1 functions What is an inverse? How do you find an inverse?	Inverse Symmetry Graphs	Exponential Functions Domain Range Increasing Graphs	Translations and dilations of exponentials and the effect on domain, range, & asymptote	Quiz
Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Project Exponential Functions	Introduction to logarithms & graphs Converting logs to exponents (vise versa)	Simplifying expressions such as $\log_2 32$	Log Rules Discover rules with worksheet Unlocking the mystery of log rules	Quiz
Day 11	**Day 12**	**Day 13**	**Day 14**	**Day 15**
Practice using rules	Practice using rules	Finish project question Extend project into interest compounded n times a year and continuously compounded	Solve simple exponential functions with logs	Solving more complex logs & exponential equations
Day 16	**Day 17**	**Day 18**	**Day 19**	**Day 20**
Continued practice	Translations and dilations of logarithms and the effect on domain, range, & asymptote	Quiz Review	Review	Test

Exponent and Logarithms Unit				Day 1
Daily Objective	*Learn what is an inverse*	**Ohio Content Standards**		
		K-8-10	Geometry and Spatial Sense (F)	
		K-8-10	Patterns, Functions and Algebra (A, B, D, E)	
Materials Needed		K-8-10	Mathematical Processes (A, B, C, F)	
		K-8-10	Measurement (F)	
		K-11-12	Patterns, Functions and Algebra (A)	
		K-11-12	Mathematical Processes (F, H, I, J)	

Activities	**Time Allotted**
1. Discuss one to one functions 2. What is an inverse? 3. How do I find an inverse?	45 min

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit	Day 2

		Ohio Content Standards	
Daily Objective	*Graphing inverse*		
Materials Needed			

Activities	Time Allotted
1. Graph inverse functions 2. Show symmetry relationships 3. Show $y=e^x$ and $y=\log x$ as an inverse example without naming them	45 min

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit				Day 3
Daily Objective	*Understanding exponential functions*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Exponential function introduction 2. Find domain, range 3. Characteristics of graph	45 min

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit				Day 4
Daily Objective	*Characteristics of exponential graphs*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Teach translation and dilations of exponentials and their effect on domain, range and asymptotes	45 min

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit	Day 5

Daily Objective	*Assessment*	Ohio Content Standards	
Materials Needed			

Activities	Time Allotted
1. Assessment over days 1-4 2. Extra time? 3. Start project Exponential functions 4. Students need to get cost of college, car, house for HW (see project)	35-40 min

Journal Prompt	Assessment

Notes

Exponential Function (content covered)
Introduction to function notation
Determine domain and range
Recognize and determine whether a function is one-to-one
Distinguish on what intervals a function in increasing decreasing or constant
Inverse functions: demonstrate and find the inverse function of a function
Graph exponential equations
Solve exponential equations

Essential Question - When you were born, you were the first grandchild of the family. Therefore your grandfather gave your parents $5000 to invest for your future. Assuming no other money is invested and this money continues to grow at the rate of 9.5% annual interest compounded annually, at what age are you able to do the following with your money if you wanted to:

1. Go to college
2. Buy a new car
4. Have a 20% down payment on a house

Guidelines:
Describe your independent and dependent variables
Find the relevant domain and range
Set up table and write an equation using function notation relating the independent and dependent variables

For teacher – let students generate different ways to solve. Now encourage them to solve algebraic which should lead them to the need for logarithms. (Go to lesson, address need to solve, then finish problem)

Extension:
Go into compounding n times a year and continuously compounding

Exponent and Logarithms Unit	Day 6

Daily Objective	*Exponential functions*	Ohio Content Standards	
Materials Needed			

Activities	Time Allotted
1. Exponential function project Students will see a need to solve $y=5000(1.095)^x$ and therefore their need to solve x as an exponent	45 min

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit			Days 7-8
Daily Objective	*Learning logarithms*	**Ohio Content Standards**	
Materials Needed			

Activities	**Time Allotted**
1. Introduction to logs 2. Graph logs 3. Convert logs to exponents and vise versa 4. Simplify expressions such as $\log_2 32$	45 min 45 min

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit				Days 9-11
Daily Objective	*Discover log rules*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Discover log rules using unlocking the Mystery of Log Rules	3- 45 min classes

Journal Prompt	Assessment

Notes

Unlocking the Mystery of Log Rules

Part A: Determining the Basic Properties

Keeping in mind your vast knowledge of logarithms and what logarithms really are, complete the following properties.

$\log_b b = \boxed{}$

$\log_b 1 = \boxed{}$

$\log_b b^x = \boxed{}$

$b^{\log_b x} = \boxed{}$

Part B

This next level of properties is going to require a little more brainpower. Follow these guidelines to complete the following property.

$$\log_b MN = \boxed{}$$

Let $x = \log_b M$ and $y = \log_b N$

Rewrite each of these equations as exponentials. ____________ and ____________

So, $MN =$ ________ • _________

Now using exponential properties,
combine into a single exponential expression. $MN =$ _______________

Therefore, $\log_b MN =$ _________________

Part C

Using steps similar to those used in *Part B*, complete the following:

$\log_b \frac{M}{N} = \boxed{}$

Part D

Now we are going to work to complete $\log_b M^P = \boxed{}$

Using the property in *Part B*, complete the following:

$\log_b M^2 =$ ________________

$\log_b M^3 =$ ________________

$\log_b M^4 =$ ________________

•
•
•

What pattern do you notice? Now complete the following.

$\log_b M^P =$ ________________

Part E: Change of Base Formula

Calculators readily complete common logs (base 10) and natural logs (base *e*). So, when working with a log of a different base it is convenient to use the change of base formula. Although it is most common to convert a logarithm into a ratio of common logs or natural logs, they can actually be converted into a ratio of logs of any base.

Now we will work to derive the change of base formula:

$$\log_b x = \frac{\log_c \square}{\log_c \square}$$

Let $y = \log_b x$

Now change the above log into an exponential. ________________

Take $\log_c$ of both sides. ____________________ =

____

Now use the property from Part D and solve for y. _________________________

Remember, $y = \log_b x$, so, $\log_b x = \dfrac{\log_c \square}{\log_c \square}$

Part F

A student was overheard saying that "multiplication becomes addition and division becomes subtraction when working with logarithms." Using your knowledge of logarithms and exponentials, explain why this is true and what it means.

Unlocking the Mystery of Log Rules

Part A: Determining the Basic Properties

Keeping in mind your vast knowledge of logarithms and what logarithms really are, complete the following properties.

$\log_b b = \boxed{1}$

$\log_b 1 = \boxed{0}$

$\log_b b^x = \boxed{x}$

$b^{\log_b x} = \boxed{x}$

Part B

This next level of properties is going to require a little more brainpower. Follow these guidelines to complete the following property.

$$\log_b MN = \boxed{\log_b M + \log_b N}$$

Let $x = \log_b M$ and $y = \log_b N$

Rewrite each of these equations as exponentials. $b^x = M$ and $b^y = N$

So, $MN = b^x \bullet b^y$

Now using exponential properties,
combine into a single exponential expression. $MN = b^{x+y}$

Therefore, $\log_b MN = x + y$

$\log_b MN = \log_b M + \log_b N$

Part C

Using steps similar to those used in *Part B*, complete the following:

$\log_b \frac{M}{N} = \boxed{\log_b M - \log_b N}$

Let $x = \log_b M$ and $y = \log_b N$

$b^x = M \quad and \quad b^y = N$

$\log_b \frac{M}{N} = x - y$

$\log_b \frac{M}{N} = \log_b M - \log_b N$

Part D

Now we are going to work to complete $\log_b M^P = \boxed{P \log_b M}$

Using the property in *Part B*, complete the following:

$\log_b M^2 = \underline{\log_b M \cdot M = \log_b M + \log_b M = 2\log_b M}$

$\log_b M^3 = \underline{3\log_b M}$

$\log_b M^4 = \underline{4\log_b M}$

•
•
•

What pattern do you notice? Now complete the following.

$\log_b M^P = \underline{P\log_b M}$

Part E: Change of Base Formula

Calculators readily complete common logs (base 10) and natural logs (base *e*). So, when working with a log of a different base it is convenient to use the change of base formula. Although it is most common to convert a logarithm into a ratio of common logs or natural logs, they can actually be converted into a ratio of logs of any base.

Now we will work to derive the change of base formula:

$$\log_b x = \frac{\log_c x}{\log_c b}$$

Let $y = \log_b x$

Now change the above log into an exponential. $b^y = x$

Take $\log_c$ of both sides. $\log_c b^y = \log_c x$

Now use the property from Part D and solve for y. $y \log_c b = \log_c x$

$$y = \frac{\log_c x}{\log_c b}$$

Remember, $y = \log_b x$, so, $\log_b x = \frac{\log_c x}{\log_c b}$

Part F

A student was overheard saying that “multiplication becomes addition and division becomes subtraction when working with logarithms.” Using your knowledge of logarithms and exponentials, explain why this is true and what it means.

Exponent and Logarithms Unit	Day 12

Daily Objective	*Assessment*	Ohio Content Standards	
Materials Needed			

Activities	Time Allotted
1. Assessment over days 6-11	45 min

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit				Days 13
Daily Objective	*Finish project*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Finish exponential function project 2. Extend project into interest compounded n times a year and continuously compound	45 min

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit				Days 14-16
Daily Objective	*Solving exponentials and logs*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Solve simple exponentials with logs (and vise versa) 2. Solve more complex – logs and exponential equations	45 min 2 – 45 min days

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit			Day 17
Daily Objective	*Characteristics of logs*	**Ohio Content Standards**	
Materials Needed			

Activities	**Time Allotted**
1. translations and dilations of logs and the effect on domain, range and asymptote	45 min

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit				Day 18
Daily Objective	*Assessment*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Assessment over days 13-17 Extra time? Start review for test	35-40 min

Journal Prompt	Assessment

Notes

Exponent and Logarithms Unit				Days 19-20
Daily Objective	*Review and assessment*	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
1. Day 19 – Review	45 min
2. Day 20 – Test	45 min

Journal Prompt	Assessment

Notes

Geometry Unit

Geometry Calendar

Day 1	Day 2	Day 3	Day 4	Day 5
Show pictures of miniature golf course Brief history of miniature golf courses Explain project Exit slip on what they will need to know for the project	Discuss exit slips??? Sketchpad activity to introduce angles of incidence and reflection Worksheet???	Go over assignment Give groups time to work on a rough draft of course	Work day	Reintroduce slopes and equations of lines Assign worksheet
Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Go over assignment Time to work Assign worksheet	Work on project	Reintroduce formulas (area, volume, distance form, etc.) Assign worksheet	Go over assignment Reintroduce properties of angles and segments Assign worksheet	Go over assignment Reintroduce properties of polygons and circles Assign worksheet
Day 11	**Day 12**	**Day 13**	**Day 14**	**Day 15**
Go over assignment Work on project	Work on Project	Finalize presentation - practice	Finalize presentation - practice	Presentations
Day 16	**Day 17**	**Day 18**	**Day 19**	**Day 20**
Presentations				

Geometry Unit

Day	Ohio Academic Content Standard(s)	Ohio Benchmark(s)
1		Overview of activity
2		Overview of activity
3	Geometry and Spatial Sense (8 - 10)	C. Recognize and apply angle relationships in situations involving intersecting lines, perpendicular lines and parallel lines.
	Geometry and Spatial Sense (8 - 10)	D. Use coordinate geometry to represent and examine the properties of geometric figures.
4	Geometry and Spatial Sense (8 - 10)	C. Recognize and apply angle relationships in situations involving intersecting lines, perpendicular lines and parallel lines.
	Geometry and Spatial Sense (8 - 10)	E. Draw and construct representations of two-and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology.
	Measurement (8 - 10)	E. Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.
	Patterns, Functions and Algebra (8 - 10)	C. Translate information from one representation (words, table, graph or equation) to another representation of a relation or function.
5	Patterns, Functions and Algebra (8 - 10)	D. Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problems situations.
	Use Algebraic Representations	6. Write and use equivalent forms of equations and inequalities in problem situations; e.g., changing a linear equation to the slope-intercept form.
	Use Algebraic Representations	8. Find linear equations that represent lines that pass through a given set of ordered pairs, and find linear equations that represent lines parallel or perpendicular to a given line through a specific point.
6	Measurement (8 - 10)	Estimate and measure to a required degree of accuracy and precision by selecting and using appropriate units, tools and technologies.
	Measurement (8 - 10)	4. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software.
7	Measurement (8 - 10)	Estimate and measure to a required degree of accuracy and precision by selecting and using appropriate units, tools and technologies.

	Measurement (8 - 10)	4. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software.
8	Measurement (8 - 10)	E. Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.
	Patterns, Functions and Algebra (8 - 10)	C. Translate information from one representation (words, table, graph or equation) to another representation of a relation or function.
	Geometry and Spatial Sense (8 - 10)	C. Recognize and apply angle relationships in situations involving intersecting lines, perpendicular lines and parallel lines.
9	Patterns, Functions and Algebra (8 - 10)	C. Translate information from one representation (words, table, graph or equation) to another representation of a relation or function.
	Geometry and Spatial Sense (8 - 10)	D. Use coordinate geometry to represent and examine the properties of geometric figures.
10	Geometry and Spatial Sense (8 - 10)	A. Formally define geometric figures.
	Geometry and Spatial Sense (8 - 10)	C. Recognize and apply angle relationships in situations involving intersecting lines, perpendicular lines and parallel lines.
11	Geometry and Spatial Sense (8 - 10)	C. Recognize and apply angle relationships in situations involving intersecting lines, perpendicular lines and parallel lines.
	Geometry and Spatial Sense (8 - 10)	A. Formally define geometric figures.
	Patterns, Functions and Algebra (8 - 10)	D. Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problems situations.
12	Geometry and Spatial Sense (8 - 10)	E. Draw and construct representations of two-and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology.
13	Spatial Relationships--Use technology lab	4. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software.
14	Measurement (8 - 10)	B. Use formulas to find surface area and volume for specified three-dimensional objects accurate to a specified level of precision.
15	Number, Number Sense and Operations (11 - 12)	D. Demonstrate fluency in operations with real numbers, vectors and matrices, using mental computation or paper and pencils calculations for simple cases and technology for more complicated cases.
16	Geometry and Spatial Sense (8 - 10)	E. Draw and construct representations of two-and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology.

17	Geometry and Spatial Sense (8 - 10)	E. Draw and construct representations of two-and three-dimensional geometric objects using a variety of tools, such as straightedge, compass and technology.
18	Student Presentations	
19	Student Presentations	
20	Unit Test	

GEOMETRY				Day 1 of 20
Daily Objective	*Introduce Miniature Golf Course Project.*	**Ohio Content Standards**		
Materials Needed	Project handouts			

Activities	**Time Allotted**
1. Discuss experiences of playing miniature golf. Perhaps, display picture from the internet in order to gain student interest.	10 min
2. Pass out project handouts and present project.	20 min
3. Explain angles of incidence and reflection.	10 min

Journal Prompt	Assessment

Notes

Miniature Golf Course Design

Pondo Engineering has hired our class to design a new miniature golf course. We will need to design 18 greens, with every green different from all the others. The course owner has asked that the course be level (no hills or loop-de-loops).

Course Description:

1. Create a design for one hole of the miniature golf course. Draw your design on a coordinate plane so that it will cover all four quadrants. You will design your course using the Geometer's Sketchpad.

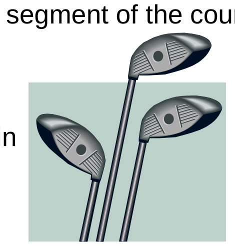
2. On the coordinate plane, label the coordinates of intersection of the walls and the coordinates of all the blockers and structures created. Indicate the scale used.

3. Show the route on the graph paper that the ball must take in order to get a hole-in-one and label the points. Label the path with letters starting with "A" at the tee.

4. Label all of the angles of incidence on the ball's route and be sure it equals the angle of reflection. (Label both the angle of incidence and angle of reflection.)

5. Curves are allowed on the course, but the ball must always hit a flat segment of the course.

6. The course must have at least 7 sides, but not more than 18.



7. You must have at least 7 checkpoints but no more than 14 checkpoin ts where the ball bounces off a sidewall or blocker. The tee and the hole also are checkpoints.

8. You must have at least 1 but no more than 3 obstacles (tunnels, ramps, sand traps, water hazards).

9. The ball must always hit the side, blocker, obstacle, or ramp at the intersection of grid lines on the graph paper.

Cost Estimate:

1. You will find the cost estimate to build your miniature golf course hole.

2. Provide a detailed list of materials needed and the cost to purchase these materials.

3. Provide information as to where you will purchase these materials.

4. Make sure that you show all work involved in finding the area and perimeter of your miniature golf course hole.

Spreadsheet:

1. Fill out the given spreadsheet completely and correctly.

2. Include a page showing all your work for finding the slopes and the equations of your segments.

Presentation:

1. You will make a model of your golf course holes. Make sure the model is accurate to your plans and contains all the required elements.

2. You will present you proposal for the miniature golf course to Pondo Engineering (the class). You may do this in the form of a power point, movie, or any other appropriate means.

3. Your presentation needs to be persuasive. Remember, you are trying to sell this miniature golf course.

4. Be creative in your presentation and provide all necessary information.

Journal:

1. You will write a reflection journal on the process of creating your miniature golf course. The reflection journal should include how ideas changed and why they changed. The journal is to include any difficulties with the project and what you did to overcome those challenges.

2. Your journal should be 1-2 typed pages in length.

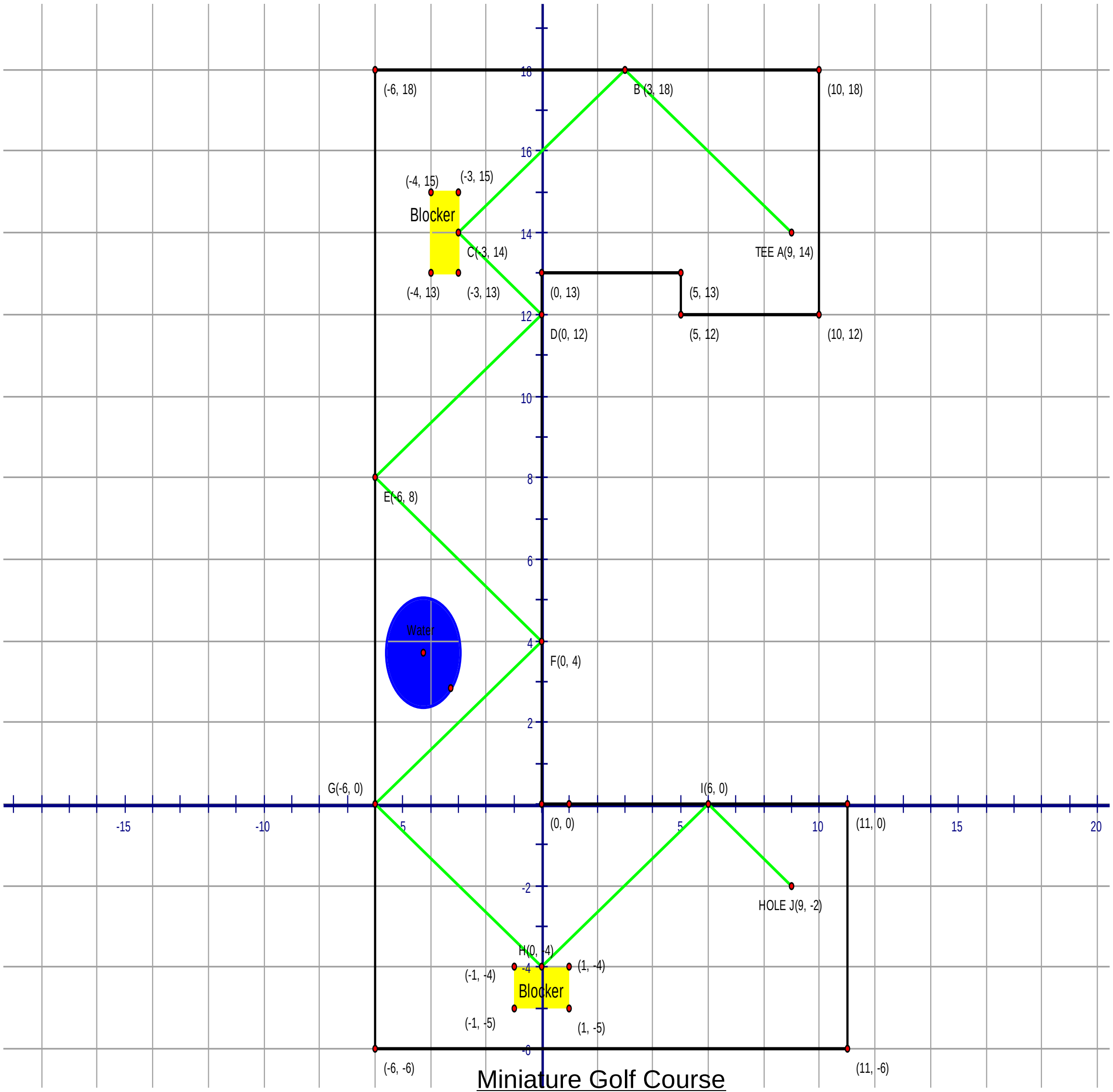
3. Use correct grammar, punctuation, and spelling.

Golf Ball Spreadsheet

Leg of Ball’s Route	**Slope of Leg** ***(Fraction in lowest terms)***	**Equation of the Line** **y = mx + b**

Golf Course Grading Rubric

Spread Sheet (10 Points)	Point Value	Points Earned	Comments
Leg segments are correctly labeled.	2		
Slopes are correct.	3		
Equation of lines correct.	3		
All work is included with spreadsheet.	2		
Graph (23 Points)			
Course diagram is drawn in all four quadrants	2		
The walls and blockers are correctly labeled.	2		
Angles of incidence and reflection are correctly labeled.	3		
Theoretical path of the ball is clearly marked with letters and coordinates.	3		
Course has from 7 to 18 sides.	3		
Course has from 7 to 14 checkpoints and they are correctly labeled.	3		
Course has from 1 to 3 obstacles and they are clearly marked.	3		
Scale is noted.	2		
Sketchpad diagram is creative and printed in color.	2		
Presentation (17 Points)			
Presentation is creative and well organized.	3		
Model is accurate to plans and includes all required elements.	5		
Speaks clearly with appropriate vocabulary and information.	3		
Presentation provides the necessary information.	3		
Presentation ends with a summary.	3		
Cost Estimate (12 Points)			
List of materials needed is complete.	3		
Costs are accurately figured.	3		
Resource for materials is complete.	3		
Complete area and perimeter of golf hole is accurately figured.	3		
Journal (8 Points)			
Key questions answered.	3		
Correct grammar, punctuation, spelling, etc.	3		
Journal is 1-2 typed pages in length.	2		
TOTAL POINTS	70		
GRADE			



Miniature Golf Course

Scale: 1:1 Foot

GEOMETRY				Day 2 of 20
Daily Objective	*Brainstorm what students will need to know in order to complete project. Review Sketchpad.*	**Ohio Content Standards**		
Materials Needed	Project handouts			
	Picture of miniature golf course.			

Activities	**Time Allotted**
1. Discuss experiences of playing miniature golf. Perhaps, display a picture from the internet in order to gain student interest.	10 min
2. Pass out project handouts and present project.	20 min
3. Explain angles of incidence and reflection.	10 min

Journal Prompt	Assessment: Student Feedback

Notes

GEOMETRY	Day 3 of 20

Daily Objective	*Students will develop a rough draft of their miniature golf course hole..*	**Ohio Content Standards**
Materials Needed	Graph Paper	

Activities	**Time Allotted**
1. Review requirements of the graph.	5 min
2. Students will work with their partners to develop a rough draft of their miniature golf course hole.	35 min

Journal Prompt	Assessment: Student Feedback

Notes

GEOMETRY	Day 4 of 20

Daily Objective	*Solve various problems involving angles and segments..*	**Ohio Content Standards**	
Materials Needed	Angle and Segment Worksheet		

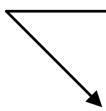
Activities	Time Allotted
1. Re-introduce angle and segment relationships and properties..	20 min
2. Pass out worksheet and allow students to get started on assignment.	20 min

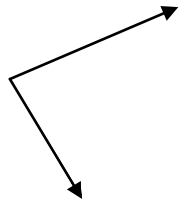
Journal Prompt	Assessment: Student Feedback

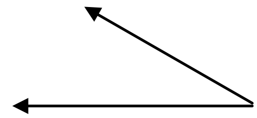
Notes

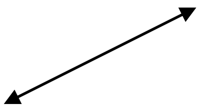
Geometry
Angles & Segments

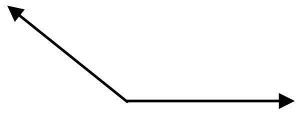
**Classify the angles as *acute, obtuse, right, or straight.*

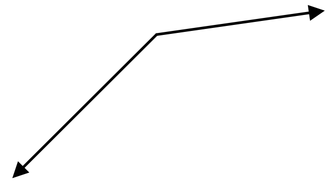
1. 

2. 

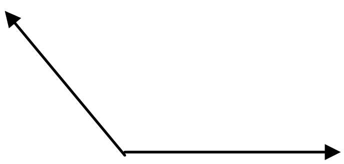
3. 

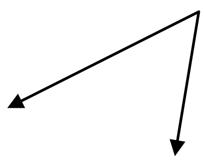
4. 

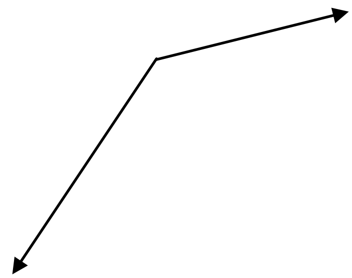
5. 

6. 

**Find the measure of each angle using a protractor.

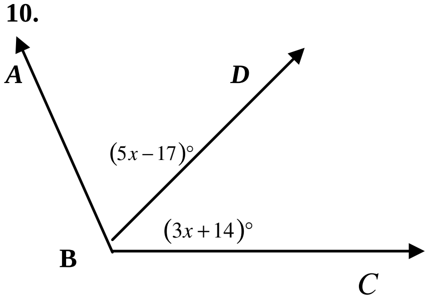
7. 

8. 

9. 

** $\overrightarrow{BD}$ bisects $\angle ABC$. Find the value of x.

10.



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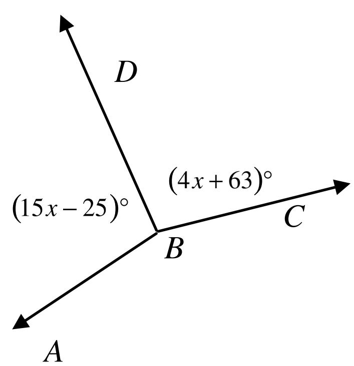
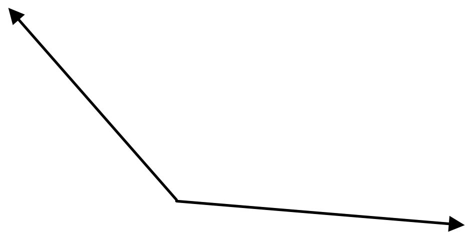


***CONSTRUCT* the angle bisectors of the angles below.

12.



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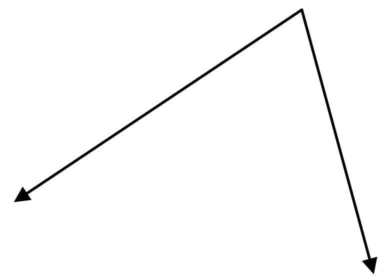
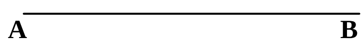


***CONSTRUCT* the segment bisector of the segments below.

14.



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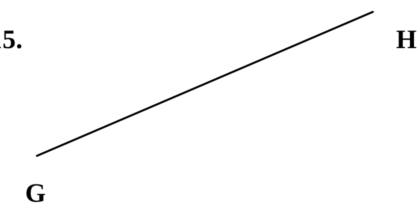


******Find the midpoint of a segment with the given endpoints.

16. $A(4,-2)$ $B(-8,-3)$

17. $P(-5.5,-6.1)$ $Q(-0.5,9.1)$

18. $E(-12,-9)$ $F(2,10)$

**Find the coordinates of the other endpoint of a segment with the given endpoint and midpoint M.

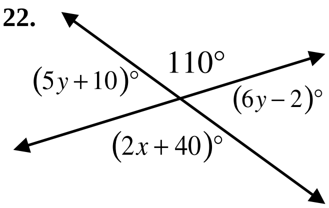
19. $Q(3,-12)$, $M(2,-1)$

20. $A(-2,7)$, $M(0,-11)$

21. $D(8,-20)$, $M(1,14)$

**Find the value(s) of the variable(s).

22.



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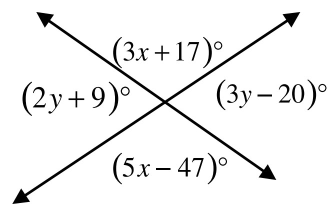

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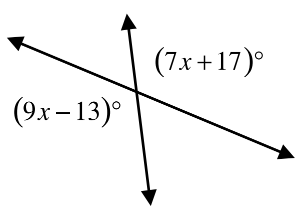

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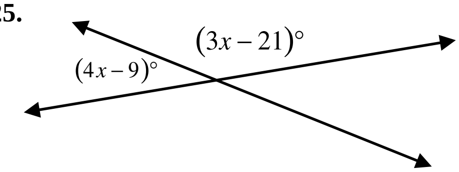


**Use the distance formula to determine whether $\overline{AB} \cong \overline{BC}$.

26. $A(4,5)$, $B(-2,3)$, $C(6,2)$

27. $A(-2,-2)$, $B(0,1)$, $C(1,4)$

28. $A(-3,5)$, $B(1,3)$, $C(4,1)$

**Classify the angles below as *corresponding, alternate interior, alternate exterior, same-side interior, vertical,* or a *linear pair.*

29. $\angle 1$ **and** $\angle 5$

30. $\angle 4$ **and** $\angle 6$

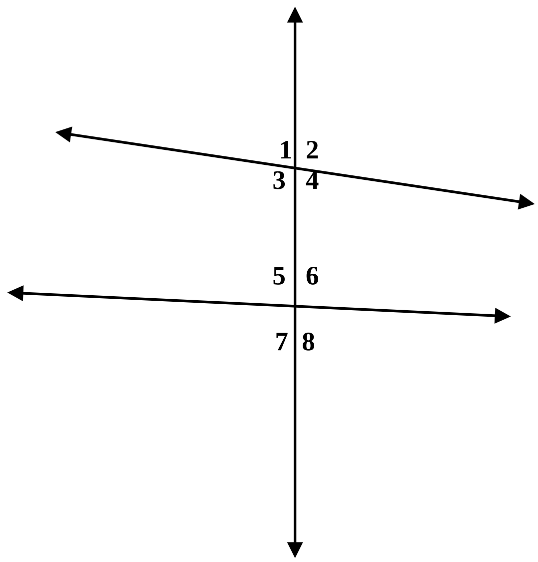
31. $\angle 6$ **and** $\angle 8$

32. $\angle 2$ **and** $\angle 3$

33. $\angle 4$ **and** $\angle 8$

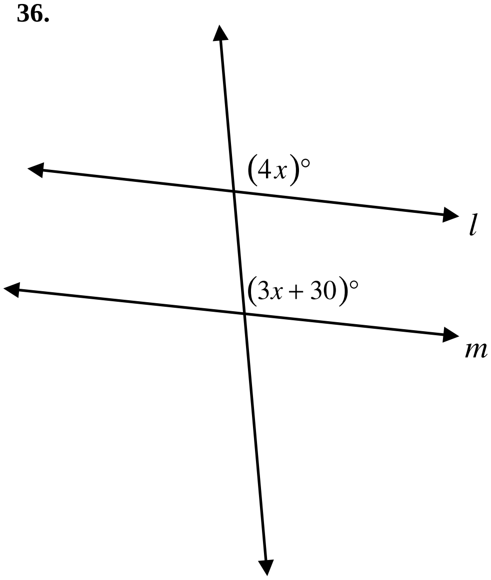
34. $\angle 4$ **and** $\angle 5$

35. $\angle 3$ **and** $\angle 7$

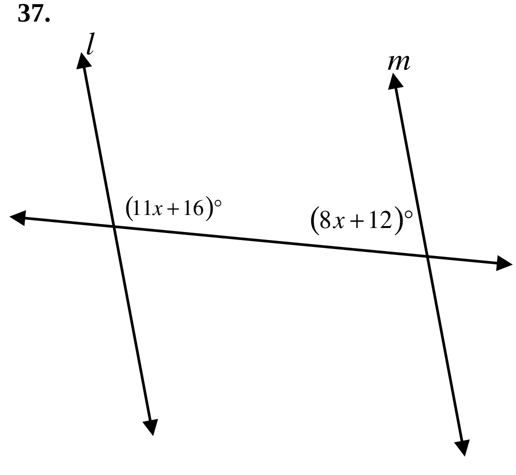


**Line *l* is parallel to line *m*. Find the value of x.

36.



37.



GEOMETRY			Day 5 of 20
Daily Objective	*Find slope and write an equation of a line.*	**Ohio Content Standards**	
Materials Needed	Slope and Equation Worksheet		

Activities	**Time Allotted**
1. Review homework from the previous day.	15 min
2. Reintroduce finding slope and writing equations of lines.	20 min
3. Pass out assignment and allow students to get started on the assignment.	5 min

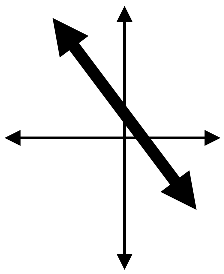
Journal Prompt	Assessment: Student Feedback

Notes

Geometry
Slopes & Equations of Lines

****State whether the slope is *positive, negative, zero,* or *undefined.***

1.



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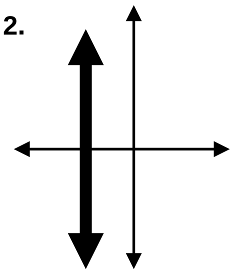
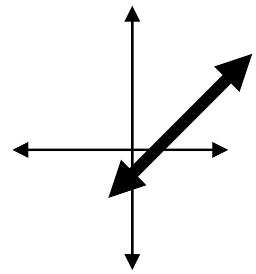


3.



****Find the slope of the line passing through the given points.**

4. (1, 5) and (2, 9)

5. (2, 3) and (4, 3)

6. (2, 4) and (1, 1)

7. (6, -8) and (6, 4)

8. (5, 2) and (5, -3)

9. (4, 1) and (2, 7)

**Find the value of y so that the line passing through the two points has the given slope.

10. (1, y), (2, 4), m = 1

11. (3, 5), (1, y), m = -2

****Find the slope of a line parallel to and of a line perpendicular to a line with the given slope.**

12. $m = -2$

13. $m = \frac{2}{3}$

14. $m = 1$

****Write an equation of the line in slope-intercept form that passes through the given points.**

15. $(0,0),(2,1)$

16. $(-2,8),(-4,13)$

17. $(4,5),(-2,-8)$

18. $(1,-3),(-4,-5)$

****Write the equation of the line in slope-intercept form that passes through the given point and has the given slope.**

19. $(5,-1), m = 0$

20. $(6,2), m = \frac{1}{2}$

21. $(-5,-7), m = -2$

22. $(3,4), m = 4$

****Determine whether the given lines are *parallel, perpendicular,* or *neither.***

23. $l_1 : 5x + 2 = y$
$l_2 : 20x - 3 = 4y$

24. $h_1 : 8x - 2y = 9$
$h_2 : 7y - 7 = 4x$

25. Write the equation of the line perpendicular to $y = -\frac{2}{3}x + 8$ and passes through the point $(12,22)$.

26. Write the equation of the line parallel to $4x - y = 7$ and passes through the point $(4,13)$.

27. What is the grade of a stretch of road with a starting elevation of 1300 ft. and the ending elevation is 1500 ft. over a horizontal distance of $\frac{1}{2}$ mile?

GEOMETRY	Day 6 of 20

Daily Objective	*Students will use Geometer's Sketchpad to design miniature golf course hole.*	**Ohio Content Standards**
Materials Needed	Computer Lab or Laptops Rough draft of miniature golf course hole	

Activities	**Time Allotted**
1. Students will use today to work with their partners on designing their miniature golf course holes using Geometer's Sketchpad.	40 min

Journal Prompt	Assessment: Student Feedback

Notes

GEOMETRY	Day 7 of 20

Daily Objective	*Students will use Geometer's Sketchpad to design a miniature golf course hole.*	Ohio Content Standards	
Materials Needed	Computer Lab or Laptops		
	Rough draft of miniature golf course hole.		

Activities	Time Allotted
1. Students will use this day to continue working with their partner on designing their miniature golf course hole using Geometer's Sketchpad.	40 min

Journal Prompt	Assessment: Student Feedback

Notes

GEOMETRY			Day 8 of 20
Daily Objective	*Find various angles in a triangle.*	**Ohio Content Standards**	
Materials Needed	Angles and Triangles worksheet		

Activities	**Time Allotted**
1. Go over assignment from day 5. (Slopes and Equations)	15 min
2. Re-introduce angles in triangles.	15 min
3. Assign worksheet and allow students to get started on assignment.	10 min

Journal Prompt	Assessment: Student Feedback

Notes

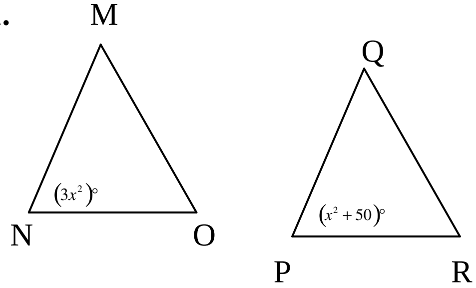
****The variable expressions represent the angle measures of a triangle. Find the measure of each angle.**

9.
$m\angle D = (4x+10)^\circ$
$m\angle E = (2x+5)^\circ$
$m\angle K = (3x-15)^\circ$

10.
$m\angle A = (2x+30)^\circ$
$m\angle B = (3x+18)^\circ$
$m\angle C = (x+12)^\circ$

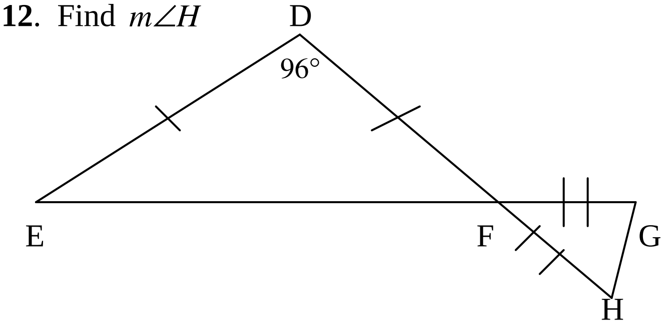
****Given $\Delta MNO \cong \Delta QPR$, find the value of x.**

11.

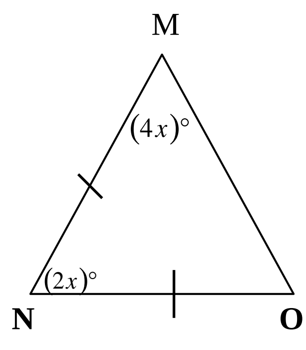


****Find each angle measurement.**

12. Find $m\angle H$



13. Find $m\angle M$



GEOMETRY	Day 9 of 20

Daily Objective	*Solve various problems with the equation of a circle.*
Materials Needed	

Ohio Content Standards	

Activities	Time Allotted
1. Go over the assignment from the previous day.	10 min
2. Re-introduce the equation of a circle.	20 min
3. Assign worksheet and allow time for students to get started on assignment.	10 min

Journal Prompt	Assessment: Student Feedback

Notes

GEOMETRY	Day 10 of 20

Daily Objective	*Solve various problems involving polygons.*	**Ohio Content Standards**
Materials Needed	Polygon worksheet	

Activities	**Time Allotted**
1. Go over the assignment from the previous day.	15 min
2. Re-introduce polygons.	15 min
3. Assign worksheet and allow students time to get started.	10 min

Journal Prompt	Assessment: Student Feedback

Notes

Geometry
Polygons

**Name the number of sides of each polygon.

1. Decagon

2. Octagon

3. Hexagon

4. Pentagon

5. Dodecagon

6. Nonagon

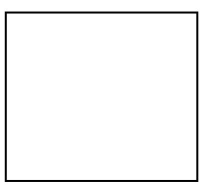
7. Quadrilateral

8. Heptagon

9. Triangle

**Decide whether the figure is a polygon.

10.



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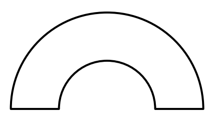

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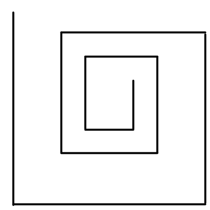

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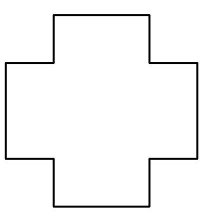

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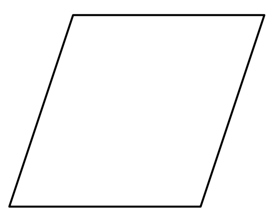

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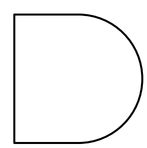
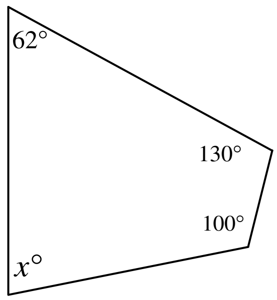


**Solve for x.

16.



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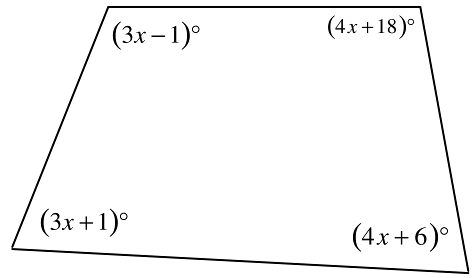

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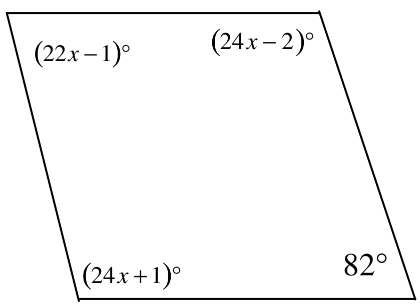

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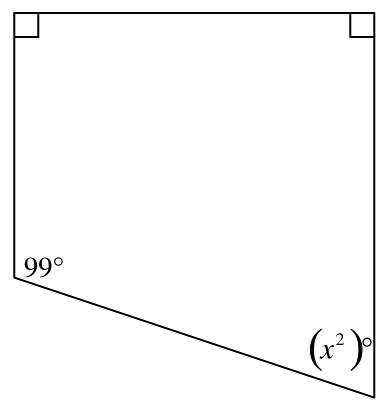


**Find the interior angle sum of the polygons below.

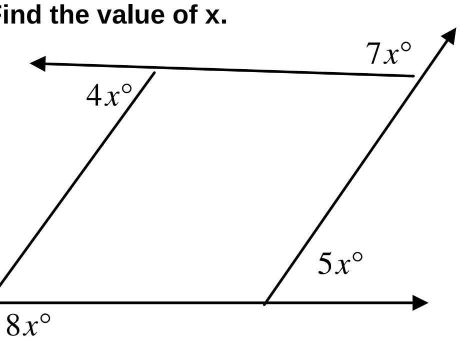
20. heptagon

21. pentagon

22. Nonagon

****Find the value of x.**

23.



Find the measure of each interior angle of the polygons below. Each polygon below is *regular*.

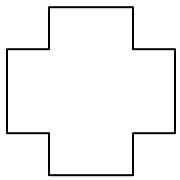
24. hexagon

25. Octagon

26. Nonagon

Determine whether each polygon is convex or concave.

27.



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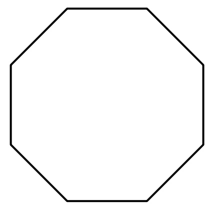
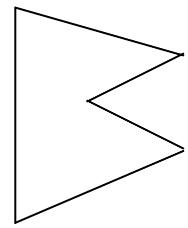


29.



Solve.

30. The Buchers are going to fence in their 30 yd. by 20 yd. rectangular garden in order to keep out the pests. They will place one fence post at each corner of the garden and fence posts along the sides at one-yard intervals. How many fence posts will they need?

31. The owners of The Pizza Palace are planning to build a rectangular parking lot that is 102 ft. wide and 120 ft. long. Each rectangular parking space will be 8 ft. wide and 12 ft. long, and three driveways will run along the length of the lot. How many cars will the lot hold?

GEOMETRY		Day 11 of 20
Daily Objective	*Solve various problems involving parallelograms and trapezoids.*	**Ohio Content Standards**
Materials Needed	Parallelogram and Trapezoid worksheet.	

Activities	**Time Allotted**
1. Go over previous day's assignment.	10 min
2. Re-introduce properties of various quadrilaterals and trapezoids.	20 min
3. Assign worksheet and allow students time to get started.	10 min

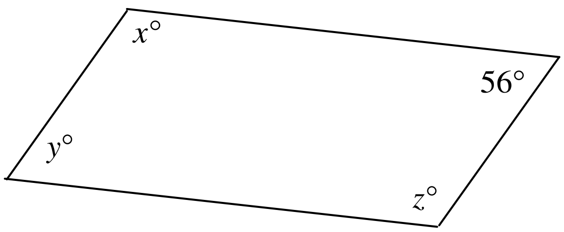
Journal Prompt	Assessment: Student Feedback

Notes

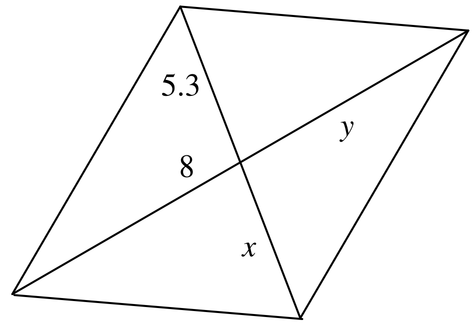
Geometry
Parallelograms and Trapezoids

Find the value of each variable in the parallelograms below.

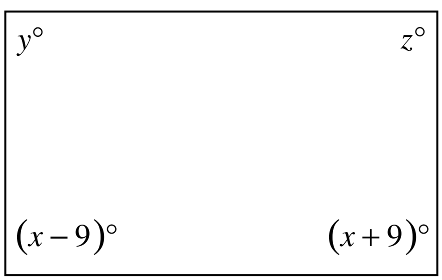
1.



2.



3.



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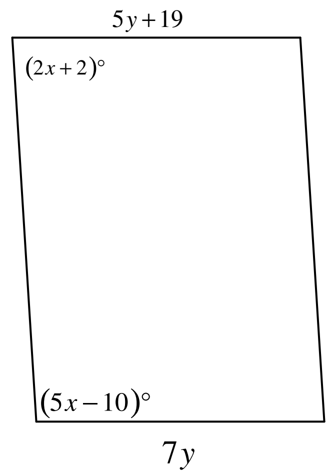
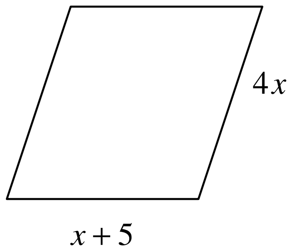
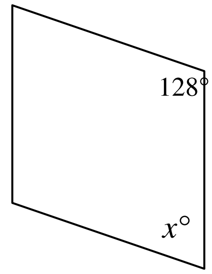


**Find the value of x in each *rhombus* below.

5.

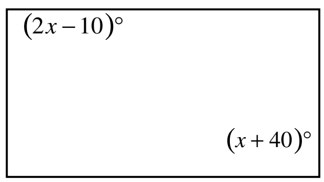


6.



**Find the value of x in each *rectangle* below.

7.



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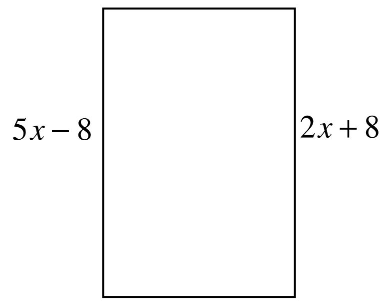
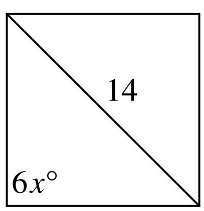


**Find the value of x in each *square* below.

9.



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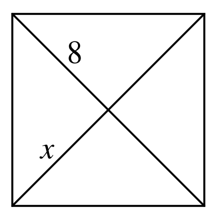


****Decide whether each statement is *sometimes, never,* or *always* true.**

11. A rectangle is a square.

12. A square is a parallelogram.

13. A square is a rhombus.

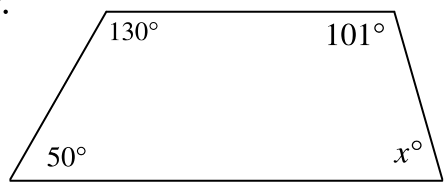
14. A square is a rectangle.

15. A parallelogram is a rhombus.

16. A rhombus is a square.

****The quadrilaterals below are trapezoids. Find the value of x.**

17.



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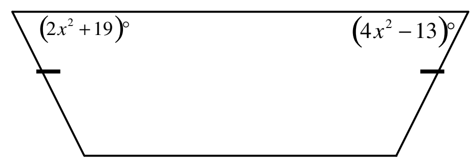

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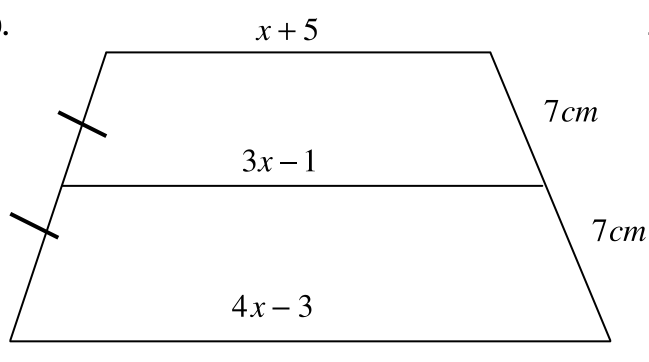

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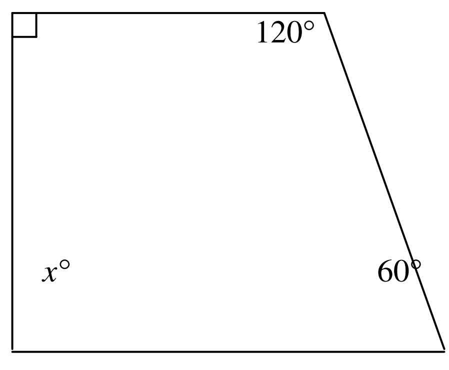


GEOMETRY	Day 12 of 20

		Ohio Content Standards	
Daily Objective	*Use a compass and straightedge to perform various constructions.*		
Materials Needed	Compass		
	Straightedge		
	Construction Worksheet		

Activities	**Time Allotted**
1. Go over previous days assignment	15 min
2. Re-introduce various constructions.	10 min
3. Students will begin work on construction worksheet.	15 min

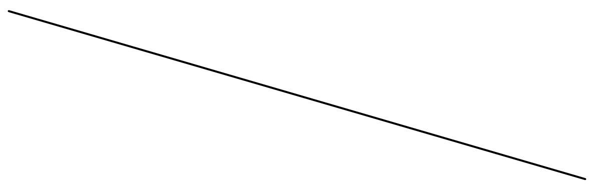
Journal Prompt	Assessment: Student Feedback

Notes

Geometry Constructions

**Construct the perpendicular bisector of each segment below.

1.



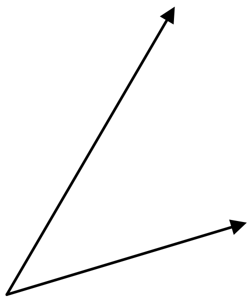
2.

Divide the segment below into ***__four__* congruent segments.

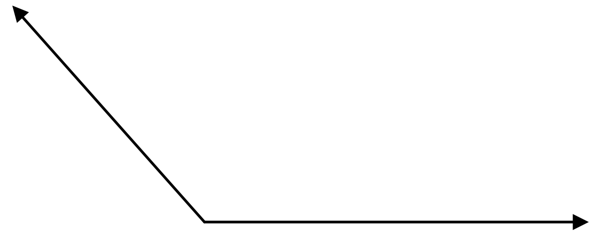
3.

**Construct the angle bisector of each angle below.

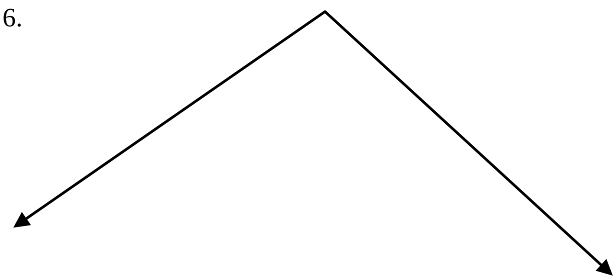
4.



5.

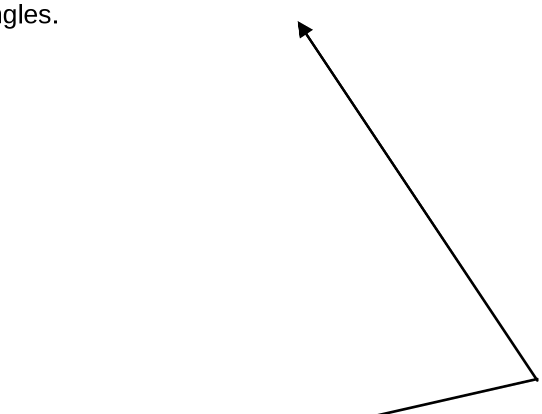


6.



**Divide the angle below into four congruent angles.

7.



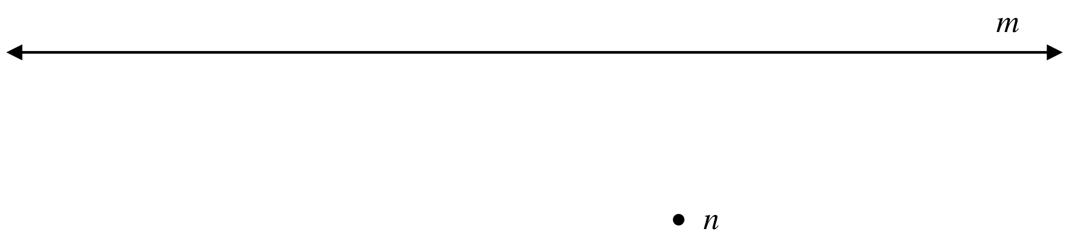
**Construct a 90° angle.

8.

**Construct a 60° angle.

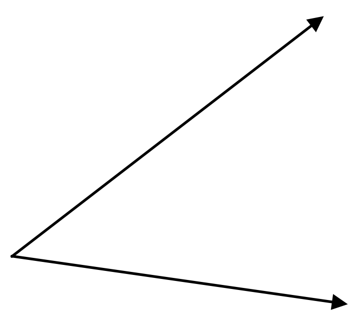
9.

10. Construct a line parallel to line *m* that passes through point *n*.



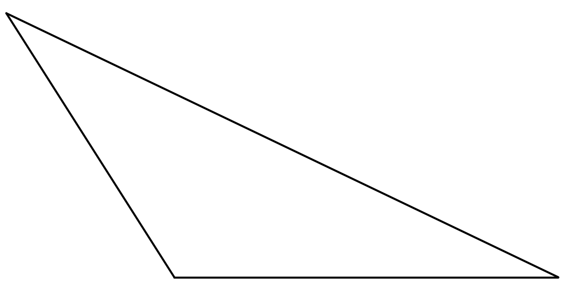
11. Construct the midpoint of the segment below.

12. Construct an angle congruent to the angle below.

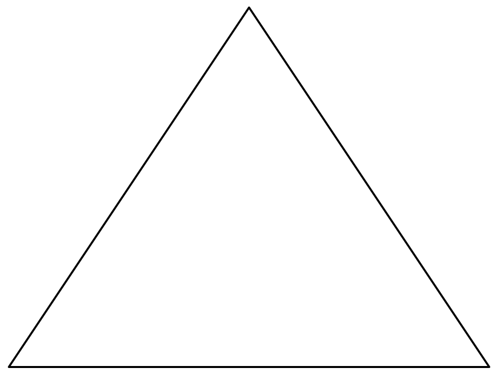


13. Construct a line perpendicular to line *l* through point *n*.

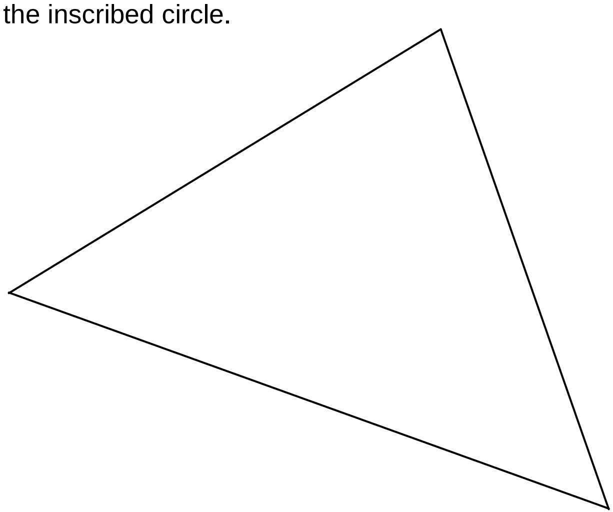
14. Construct a triangle congruent to the triangle below.



15. Construct the circumscribed circle.



16. Construct the inscribed circle.



GEOMETRY	Day 13 of 20

		Ohio Content Standards	
Daily Objective	*Students will work on miniature golf course project.*		
Materials Needed	Computer Lab or Laptops		

Activities	**Time Allotted**
1. This day is for students to work with their partners on the miniature golf course project.	40 min

Journal Prompt	Assessment: Student Feedback

Notes

GEOMETRY	Day 14 of 20

Daily Objective	*Find area and volume of various figures.*

Ohio Content Standards	

Materials Needed	Area and Volume worksheet

Activities	Time Allotted
1. Go over assignment from day 12.	10 min
2. Re-introduce area and volume.	15 min
3. Assign worksheet and allow students time to get started.	15 min

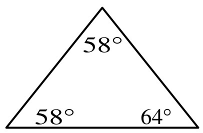
Journal Prompt	Assessment: Student Feedback

Notes

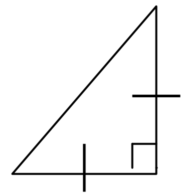
Geometry
Angles and Triangles

****Classify the triangles by its angles and by its sides.**

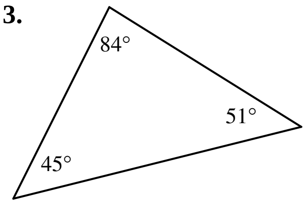
1.



2.



3.



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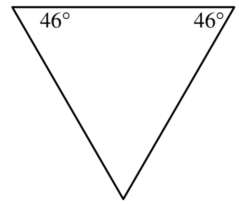
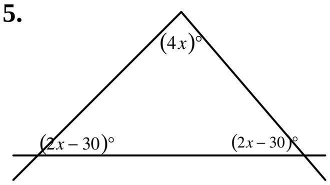


****Find x.**

5.



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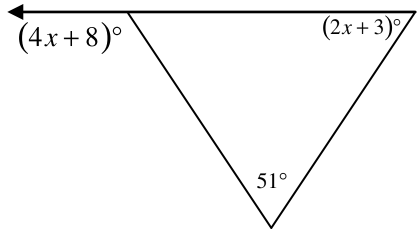

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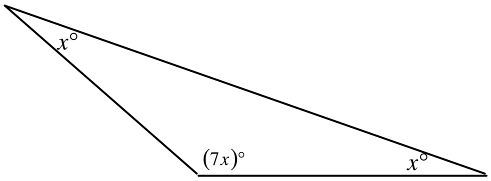

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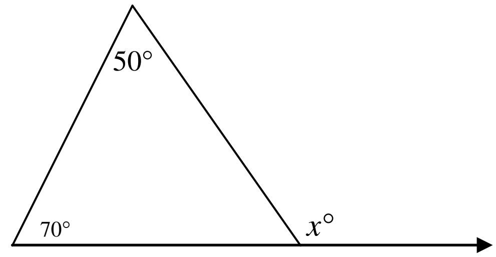


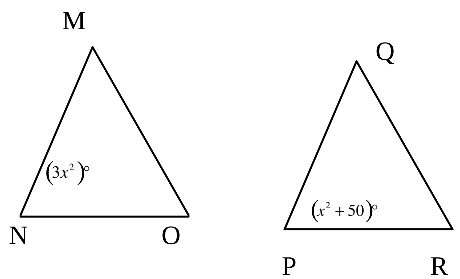
****The variable expressions represent the angle measures of a triangle. Find the measure of each angle.**

9. $m\angle D = (4x+10)^\circ$, $m\angle E = (2x+5)^\circ$, $m\angle K = (3x-15)^\circ$

10. $m\angle A = (2x+30)^\circ$, $m\angle B = (3x+18)^\circ$, $m\angle C = (x+12)^\circ$

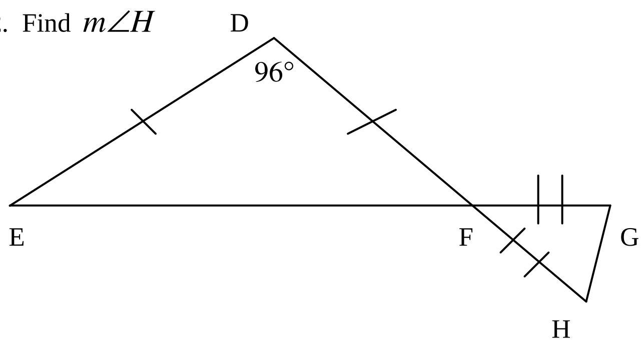
****Given $\Delta MNO \cong \Delta QPR$, find the value of x.**

11.

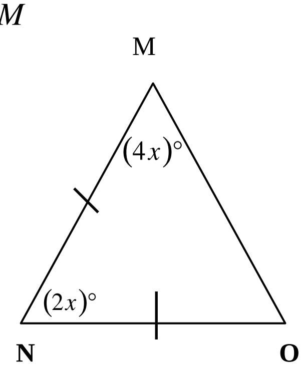


****Find each angle measurement.**

12. Find $m\angle H$



13. Find $m\angle M$



GEOMETRY	Day 15 of 20

Daily Objective	*Solve various problems involving vectors.*	**Ohio Content Standards**
Materials Needed	Vector Worksheet	

Activities	**Time Allotted**
1. Go over previous day's assignment.	15 min
2. Re-introduce vectors.	25 min
3. Assign worksheet and allow students time to get started.	

Journal Prompt	Assessment: Student Feedback

Notes

Geometry
Vectors

Vector BC has initial point B(-3, 2) and terminal point C(4, 0). Vector DE has initial point D(-1, 3) and terminal point E(0, 5). Find each quantity. Round to the nearest hundredth.

1. $|BC|$

2. $|DE|$

3. $BC + DE$

A vector has initial point *G* and terminal point *H* as given. Find the ordered pair representation and the magnitude of vector *GH.*

4. G(1, 3) and H(2, 0)

5. G(-1, -3) and H(2, 5)

6. G(-5, 4) and H(3, 2)

7. G(0, -2) and H(2, 2)

Let $\vec{j} = (-2,3), \vec{k} = (1,4), \vec{l} = (0,-2)$. **Find each sum using the algebraic method and then the parallelogram method.**

8. $\vec{j} + \vec{k}$

9. $\vec{k} + \vec{l}$

Let $\vec{a} = (3,2), \vec{b}(1,0), \vec{c}(4,-6)$. **Use the dot product to determine if the vectors are perpendicular or not perpendicular.**

10. $\vec{a}, \vec{b}$

11. $\vec{a}, \vec{c}$

GEOMETRY				Day 16 of 20
Daily Objective	*Students will work with their partner to complete project.*	**Ohio Content Standards**		
Materials Needed	Computers			

Activities	**Time Allotted**
1. Go over assignment from previous day.	10 min
2. The rest of this time is for students to continue working on their project.	30 min

Journal Prompt	Assessment: Student Feedback

Notes

GEOMETRY	Day 17 of 20

Daily Objective	*Students will complete work on their projects*	Ohio Content Standards	
Materials Needed	Computers		

Activities	Time Allotted
1. This day is for students to complete work on their projects and prepare for their presentations.	40 min

Journal Prompt	Assessment: Student Feedback

Notes

GEOMETRY				Day 18 and 19
Daily Objective	*Students will present their miniature golf course hole.*	**Ohio Content Standards**		
Materials Needed	Any equipment that the students will need to include in their presentation.			

Activities	**Time Allotted**
1. Students will present their projects to the class.	40 min

Journal Prompt	Assessment: Presentations

Notes

A grading rubric for the student projects is at the beginning of the Geometry Unit.

GEOMETRY			Day 20 of 20
Daily Objective	*Students will complete a test over the geometry unit.*	**Ohio Content Standards**	
Materials Needed	Geometry Test		

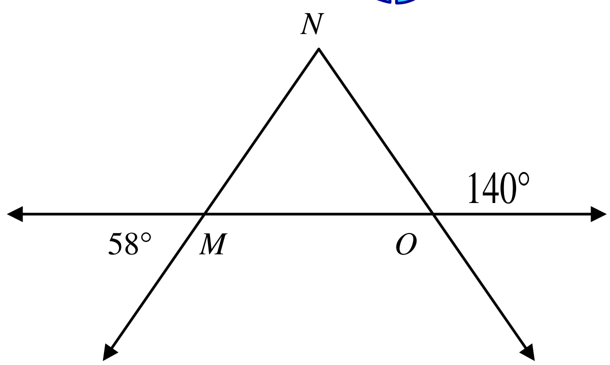
Activities	**Time Allotted**
1. Students will take the test over the unit.	40 min

Journal Prompt	Assessment: Test Results

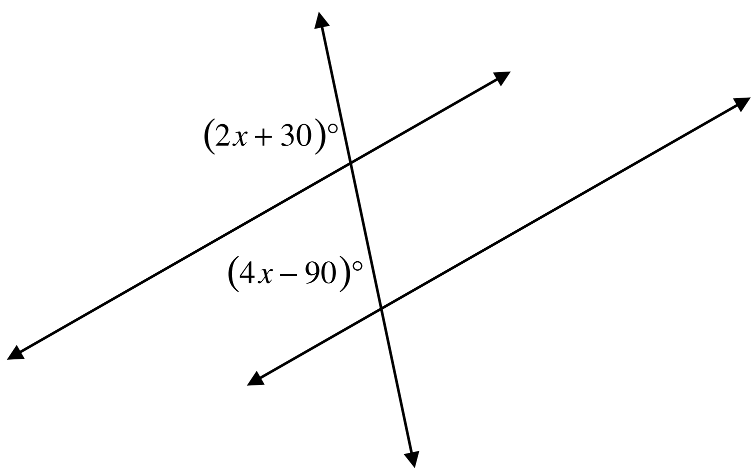
Notes

GEOMETRY TEST

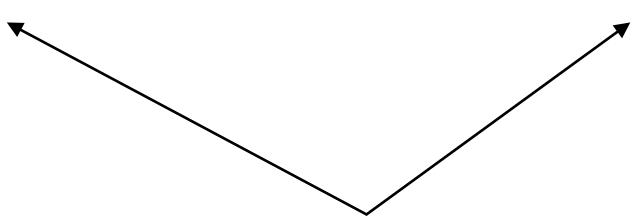
1. What is the measure of $\angle N$?



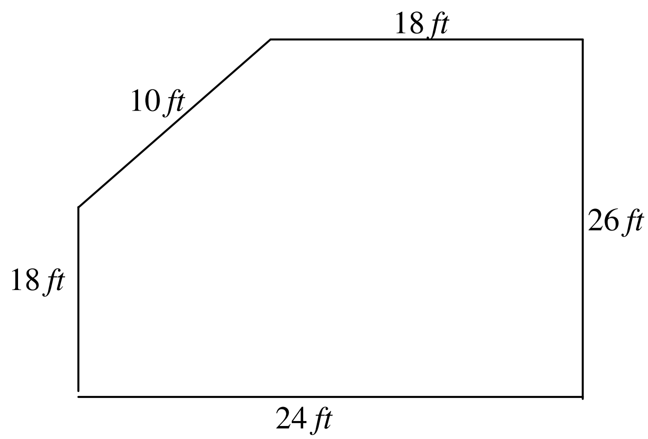
2. Line *l* is parallel to line *m*. Find the value of x.



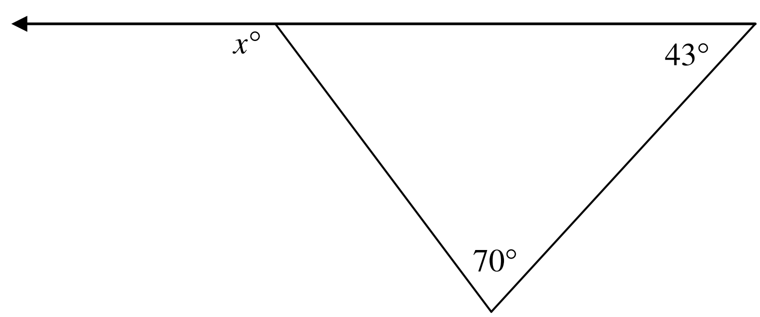
3. Construct the angle bisector of the angle below.



4. Find the area and perimeter of the figure below.



5. Find the value of x.



****Determine the number of sides that each polygon below has.**

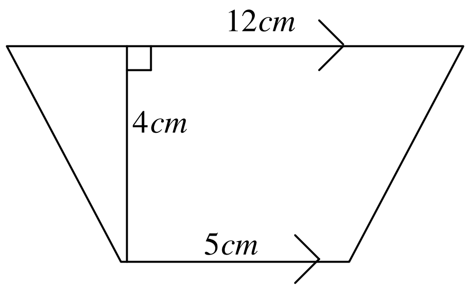
6. Heptagon

7. Pentagon

8. Decagon

Find the area of each figure.

9.



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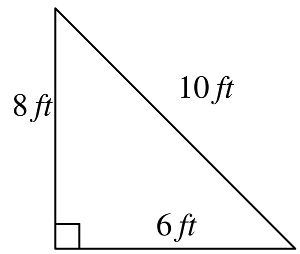

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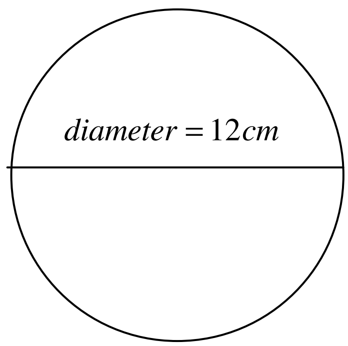

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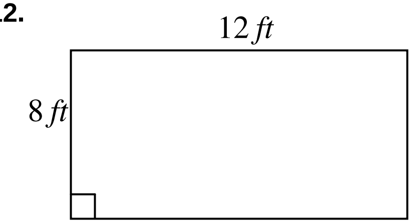


Find the slope of the line passing through the given points.

13. $(7,-8),(16,-8)$

14. $(-4,9),(-9,11)$

Find the center and the radius of the circle.

15. $(x-9)^2+(y+3)^2=25$

16. $\left(x-\frac{2}{3}\right)^2+y^2=27$

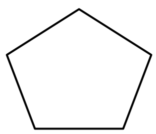
Determine whether the given lines are *parallel, perpendicular,* or *neither.*

17. $l_1 : 6x + 3 = y$
$l_2 : -x + 4 = 6y$

18. $l_1 : 8y - 5 = x$
$l_2 : 8x + 2 = y$

Determine whether each figure is a polygon.

19.



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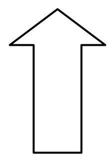

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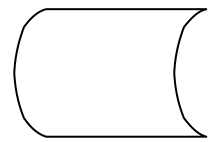
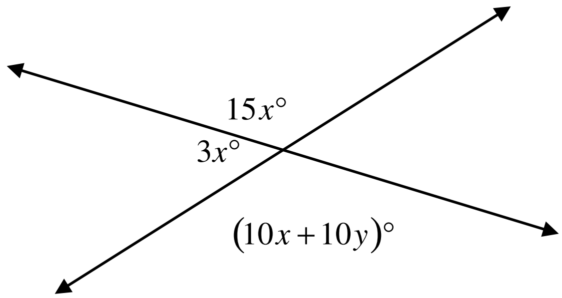


22. Write the equation in slope-intercept form of the line that passes through the point (10, -1) and has a slope of -2?

23. Write an equation of a line that is perpendicular to the line $y = 3x - 2$ and passes through the point (1, 1).

24. Find the value of x and y.



Find the length of the segment with the given endpoints.

25. $A(2,7)$ $B(-3,11)$

26. $E(0,-9)$ $F(12,8)$

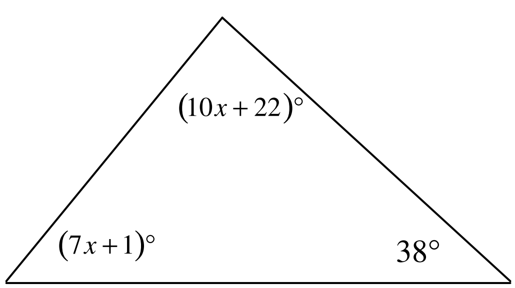
Find the midpoint of the segment with the given endpoints.

27. $M(9,22)$ $N(-2,-4)$

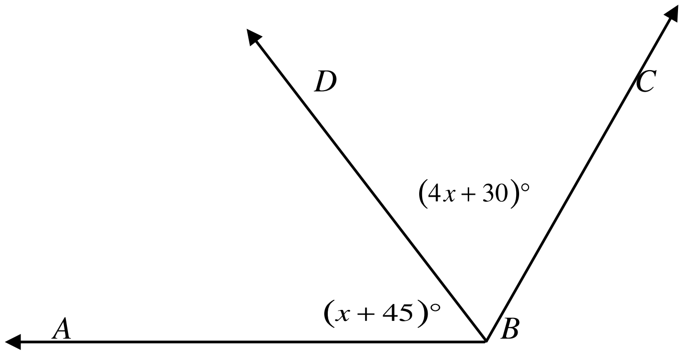
28. $C(0,-8)$ $D(-1,13)$

Find the value of x.

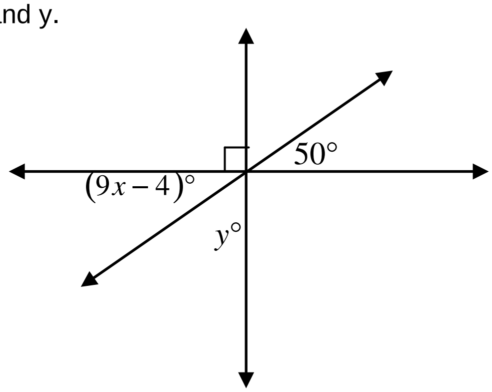
29.



30. $\overleftrightarrow{BD}$ **bisects** $\angle ABC$ **. Find the value of x.**



31. Find the value of x and y.



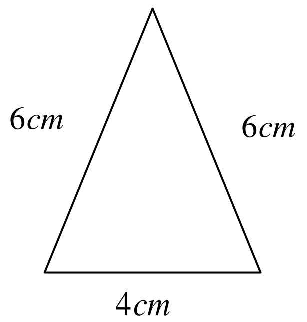
32. A circle has an equation of: $x^2+(y-4)^2=169$. Find the circumference of the circle to the nearest tenth.

33. A cone has a base area of: $36\pi ft.$ and a height of 12 feet. Find the volume of the cone.

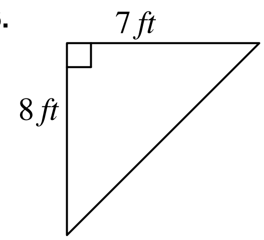
34. A circle has an equation of: $(x-2)^2+y^2=81$. Is the point (2, 8) on the circle, inside the circle, or outside of the circle?

Classify the triangles by its angles and by its sides.

35.



36.



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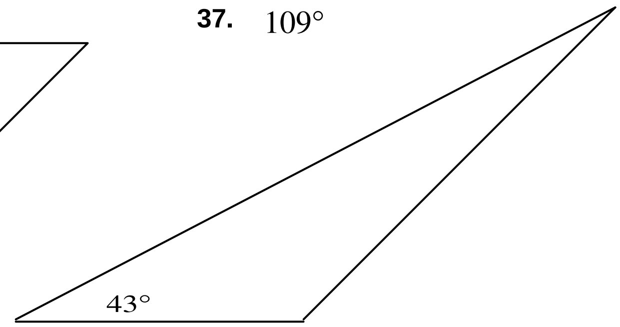


A vector has initial point P and terminal point Q as given. Find the ordered pair representation and the magnitude of vector PQ.

38. P (2, 5) and Q (4, 3)

39. P (-3, -6) and Q (1, 7)

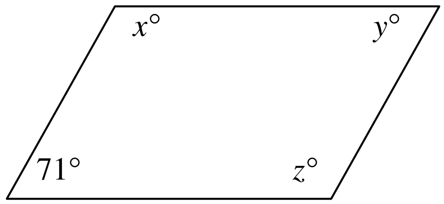
Let $\vec{j} = (-1, 3), \vec{k} = (0, 4), \vec{l} = (2, 6)$. **Find the following.**

40. $\vec{j} + \vec{k}$

41. Use the dot product to determine whether vectors $\vec{j}$ and $\vec{k}$ are perpendicular.

Find the value of each variable in the parallelograms below.

42.



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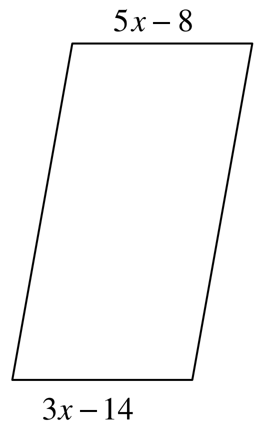
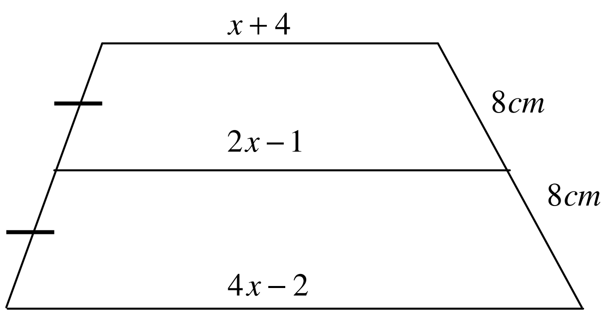


The quadrilaterals below are trapezoids. Find the value of x.

44.



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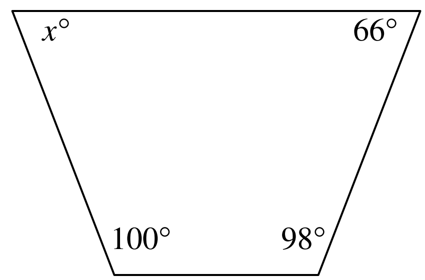
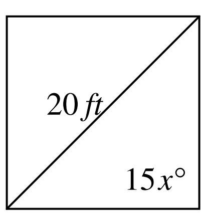
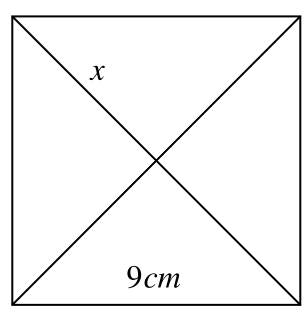


The quadrilaterals below are squares. Find the value of x.

46.

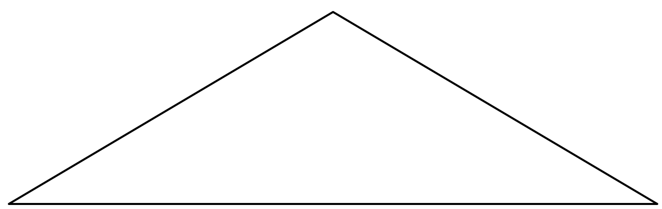


47.

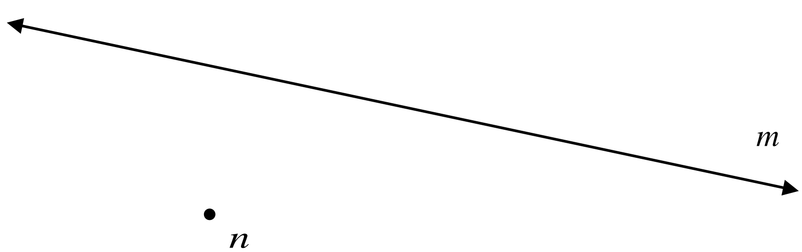


48. ***Construct*** a $30°$ angle.

49. Construct the circumscribed circle.



50. Construct a line parallel to line *m* that passes through point *n*



Trigonometry Unit

Trigonometry Calendar

Day 1	Day 2	Day 3	Day 4	Day 5
Presentation of project	Brainstorm what they need to know for the project. Review degree trig on the calculator.	Presentation on Pythagorean Theorem and completing right triangles in degrees	Complete assignment covering Pythagorean Theorem, completing right triangles in degrees, and trig on calculator	Work on project
Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Presentation of right angle trig functions	Complete assignment covering right angle trig functions	Work on project	Work on project	Assessment over degree trig
Day 11	**Day 12**	**Day 13**	**Day 14**	**Day 15**
Presentation of converting formulas (degrees to radians and back) and radian trig on calculator	Complete assignment covering converting formulas and radian trig on calculator	Work on project	Presentation of unit circle trig	Complete assignment covering unit circle trig
Day 16	**Day 17**	**Day 18**	**Day 19**	**Day 20**
Work on project	Presentation of reference angles and graphs of basic trig functions	Complete assignment covering reference angles and graphs of basic trig functions	Work on project	Assessment over unit circle trig and project turn in

Trigonometry Unit

Day	Ohio Academic Content Standard(s)	Ohio Benchmark(s)
1		Overview of activity
2	Geometry and Spatial Sense (11 - 12)	A. Use trigonometric relationships to verify and determine solutions in problem situations.
	Mathematical Processes (8 - 10)	D. Apply reasoning processes and skills to construct logical verifications or counter-examples to test conjectures and to justify and defend algorithms and solutions.
		E. Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.
3	Mathematical Processes (8 - 10)	D. Apply reasoning processes and skills to construct logical verifications or counter-examples to test conjectures and to justify and defend algorithms and solutions.
	Geometry and Spatial Sense (11 - 12)	A. Use trigonometric relationships to verify and determine solutions in problem situations.
	Geometry and Spatial Sense (8 - 10)	I. Use right triangle trigonometric relationships to determine lengths and angle measures.
4	QUIZ	
5	Project	
6 & 7	Geometry and Spatial Sense (11 - 12)	A. Use trigonometric relationships to verify and determine solutions in problem situations.
8	Project	
9	Project	
10	QUIZ	
11 & 12	Measurement (11 - 12)	B. Apply various measurement scales to describe phenomena and solve problems
	Measurement Units	2. Use radian and degree angle measures to solve problems and perform conversions as needed.
13	Project	
14	Measurement (11 - 12)	B. Apply various measurement scales to describe phenomena and solve problems
15		
16		
17 & 18	Measurement (11 - 12)	B. Apply various measurement scales to describe phenomena and solve problems
19	Project	
20	TEST	
	Depression and Elevation	
	Mathematical Processes (8 - 10)	D. Apply reasoning processes and skills to construct logical verifications or counter-examples to test conjectures and to justify and defend algorithms and solutions.

Geometry and Spatial Sense (11 - 12)	A. Use trigonometric relationships to verify and determine solutions in problem situations.
Geometry and Spatial Sense (8 - 10)	I. Use right triangle trigonometric relationships to determine lengths and angle measures.
Finding the Value of Basic Trig	
Geometry and Spatial Sense (11 - 12)	A. Use trigonometric relationships to verify and determine solutions in problem situations.
Mathematical Processes (8 - 10)	D. Apply reasoning processes and skills to construct logical verifications or counter-examples to test conjectures and to justify and defend algorithms and solutions.

Trigonometry Unit				Day 1
Daily Objective	Presentation of Unit Project	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
Presentation of unit and the project requirements. Pondo Engineering has hired our class to measure the surface area of India. Because of an error found in the software package that you have to find areas of countries, you will have to use right angle trigonometry to find the area. You will have to make a presentation to Pondo Engineering documenting all your math processes to verify your findings.	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit				Day 2
Daily Objective	The student will be able to convert decimal degrees to DMS and DMS to decimal degrees. The student will be able to find trig functions and angle measures using a calculator.	**Ohio Content Standards**		
		11.2	Use radian and degree angle measures to solve problems and perform conversions as needed.	
Materials Needed	Worksheet #1			

Activities	**Time Allotted**
1. Brainstorm what facts and math concepts the students will need to know to complete the project	15 min
2. Present the conversion of decimal degrees to DMS and DMS to decimal degrees.	10 min
3. Present how to find trig functions and angles measures on a calculator.	15 min

Journal Prompt	Assessment

Notes

Trig and Inverse Trig on a TI-86

Students may use their own graphing calculators on this and subsequent projects. However, the entry procedures may differ somewhat from the directions stated here. If you do not wish to determine how your graphing calculator instructions vary, use one of the TI–86 models in the library. You must be prepared to generate similar values on the calculator model of your choice during tests without the use of detailed directions.

There are five goals of this project:

1-2. To convert degrees in decimal to degrees, minutes, seconds. Also, vice versa.
3-4. To convert angle measures from degree to radian units. Also, vice versa.
5. To familiarize each student with trigonometry and inverse trigonometry entry procedures on a calculator by providing more/ mixed practice problems than are supplied by the current text.

General Directions: Place your name, course name with section number, and due date on pages 5, 6, 7, and 8. Record your answer by the corresponding problem. Watch the display for clues. There are some problems that have no answer! Write the answer you think is correct, not necessarily the answer displayed on the calculator. **Turn in only the last page.**

Watch for instructions to press a specific key. If at any time you are unable to perform a particular procedure, please refer to the handbook that accompanies the calculator or ask the instructor for assistance. Hint: If you get stuck, try “EXIT” or “CLEAR”.

Press “2nd” “MATH” to access °, ', ^{r}.

****If you have set up your custom menu, go to CUSTOM to access °, ', ^{r}.**

<u>Directions for Part I: DD <––––> DMS.</u> Find DD to the nearest thousandth if given DMS. Find DMS to the nearest second if given DD. Notice by the way an angle measure is written that you can tell which form has been given to you and which form you must then find.

Sometimes partial degrees are described as a decimal degree (DD). Sometimes partial degrees are described as minutes and seconds (DMS). Conversions will be practiced with the next set of exercises.

Ex. 42.5° = 42°30’00”

This conversion process involves angles in DEGREES so the calculator must be in DEGREE mode for the answer to be correct! Press “2nd” “MODE”. Make sure the word degrees is shaded. If not, arrow down to the word degrees, then press “ENTER” and “EXIT”. Now press “2nd” “MATH” then “F3”. ******

If you are entering an angle measure in decimal degree form (DD), simply enter it as it appears. It is not necessary to enter the degree mark although it is a good habit to develop. To convert this to degrees, minutes, and seconds (DMS), press the key below “DMS” on the screen and press “ENTER”.

If you are entering an angle measure in degrees, minutes, and seconds (DMS), press the key below “ ‘ ” on the screen after entering <u>each</u> of the three parts. Again, it is not necessary to enter the degree mark although it is a good habit to develop. To convert this to degrees and decimal form (DD), press “ENTER”.

Examples to try:

36°6’0” = 36.1°
Type 36'6' or 36'6'°or 36'6'0' or 36'6'0'° then hit ENTER

54.87° = 54°52’12”
Type 54.87 or 54.87° then hit ▹DMS

<u>Directions for Part II: Sine, Cosine, Tangent Entry Procedures, given the angle measure and finding a trig value.</u> Determine the trig values to four significant digits for each of the following. Record each **real** answer, or state "undefined". It is possible to get a negative answer.

To begin: Press "2nd" "MODE". Make sure the word degrees is shaded. You do not need to change to radians mode if you are only occasionally given an angle in radians. Just enter the value as in appears, press "2nd" "MATH" "F3" ****** and then "r". You do not need to change to degree mode if you are only occasionally given an angle in degrees. Just enter the value as in appears, press "2nd" "MATH" "F3" ****** and then "°".

To find one of these trig values, enter each by pressing the appropriate trig key marked sin, cos, or tan **then** the given angle measure, paying attention to the two warnings above.

Example to try: sin 19.2° = 0.3289

<u>Directions for Part III: Cosecant, Secant, Cotangent Entry Procedures, given the angle measure and finding a trig value.</u> Determine the trig values to four significant digits for each of the following. Record each **real** answer, or state "undefined". It is possible to get a negative answer.

To find csc ϑ: Rewrite and enter as $\frac{1}{\sin \vartheta}$. To find sec ϑ: Rewrite and enter as $\frac{1}{\cos \vartheta}$.
To find cot ϑ: Rewrite and enter as $\frac{1}{\tan \vartheta}$.

Example to try: sec 85° = $\frac{1}{\cos 85°}$

= 11.47

Directions for Part IV: Sin^{-1}, Cos^{-1}, Tan^{-1} Entry Procedures, given the trig value and finding an angle in degrees. Find the missing angle (in degrees to the nearest tenth). Record each **real** answer or state "no angle could yield the given trig value". It is possible to get a negative answer.

To find ø, given the equation $\sin ø = \#$:
Rewrite as $ø = \sin^{-1} \#$. Enter the right side of the rewrite.
Read this as "what angle gives a sine value of #?".

To find ø, given the equation $\cos ø = \#$:
Rewrite as $ø = \cos^{-1} \#$. Enter the right side of the rewrite.
Read this as "what angle gives a cosine value of #?"

To find ø, given the equation $\tan ø = \#$:
Rewrite as $ø = \tan^{-1} \#$. Enter the right side of the rewrite.
Read this as "what angle gives a tangent value of #?"

If the calculator shows the answer as two numbers in parentheses, it is because there is no angle that can make the given equation true.

Examples to try: $\cos T = 0.586$ $\tan Q = 8.22$

$T = \cos^{-1} 0.586$ $Q = \tan^{-1} 8.22$

$T = 54.1°$ $Q = 83.1°$

Directions for Part IV: Csc^{-1}, Sec^{-1}, Cot^{-1} Entry Procedures, given the trig value and finding an angle in degrees. Find the missing angle (in degrees to the nearest tenth). Record each **real** answer or state "no angle could yield the given trig value". It is possible to get a negative answer.

To find ø, given the equation $\csc ø = \#$:
Rewrite twice, as $ø = \csc^{-1} \#$
then as $ø = \sin^{-1} (1/\#)$. Enter the right side of the rewrite.

To find ø, given the equation $\sec ø = \#$:
Rewrite twice, as $ø = \sec^{-1} \#$
then as $ø = \cos^{-1} (1/\#)$. Enter the right side of the rewrite.

To find ø, given the equation $\cot ø = \#$:
Rewrite twice, as $ø = \cot^{-1} \#$
then as $ø = \tan^{-1} (1/\#)$. Enter the right side of the rewrite.

If the calculator shows the answer as two numbers in parentheses, it is because there is no angle that can make the given equation true.

Examples to try: $\cot T = 0.806$ $\csc Q = 2.12$

$T = \cot^{-1} 0.806$ $Q = \csc^{-1} 2.12$

$T = \tan^{-1} (1/0.806)$ $Q = \sin^{-1} (1/2.12)$

$T = 51.1°$ $Q = 28.1°$

PRACTICE ON YOUR OWN:

Part I:

1) 30.6°	2) 55°12'30"	3) 90.025°	4) 123.4°
5) 57°40'	6) 5°59' 2"	7) 96.801°	8) 33°30'50"
9) 430.01°	10) 45°49'12"	11) 20°22'	12) 63.45°
13) 31°55'9"	14) 35'57"	15) 90.999°	16) 28.625°
17) 24.3333°	18) 5.00005°	19) 10°10'	20) 25'30"

Part II:

1) sin 30°	2) tan 55°	3) cos 90°	4) tan 23.4°
5) cos 30°	6) sin 65°	7) tan 90°	8) cos 23.4°
9) sin 54°	10) tan 87°	11) tan 70°	12) cos 72°
13) tan 3°	14) sin 135°	15) sin 0°	16) sin 23.4°
17) cos 0°	18) tan 62°	19) cos 80°7'	20) sin 63°37'12"

Part III:

1) csc 30°	2) cot 55°	3) sec 90°	4) cot 23.4°
5) sec 30°	6) csc 65°	7) cot 90°	8) sec 23.4°
9) csc 54°	10) cot 87°	11) cot 70°	12) sec 72°
13) cot 3°	14) csc 135°	15) csc 0°	16) csc 23.4°
17) sec 0°	18) cot 62°	19) sec 80°7'	20) csc 63°37'12"

Part IV:

1) sin A = .546	2) tan B = 4.3	3) cos M = .951	4) sin W = 5.00
5) cos Q = .546	6) tan F = 10.3	7) sin V = .951	8) cos D = 2.50
9) tan T = 3.546	10) sin M = 0.308	11) tan Z = 1	12) cos X = 0
13) tan H = 0.046	14) sin T = 0	15) cos L = 1	16) tan K = 0
17) cos P = 3.546	18) sin N = 3	19) sin Y = 1	20) cos R = 0.782

Part V:

1) csc A = 2.546	2) cot B = 4.3	3) sec M = 1.051	4) csc W = 5.00
5) sec Q = .546	6) cot F = 0.3	7) csc V = .951	8) sec D = 2.5
9) cot T = 3.546	10) csc M = 1.308	11) cot Z = 1	12) sec X = 2
13) cot H = 0.046	14) csc T = 0	15) sec L = 1	16) cot K = 0
17) sec P = 3.546	18) csc N = 0.999	19) csc Y = 1	20) sec R = 1.8

Write final answers under each problem.
Find angles in degrees (to tenths) and trig values to three significant digits.

Name:___________________________
Course:___________________

1. sin 20°

2. tan 5.1°

3. cos 90°

4. tan 87.4°

5. cos 30°

6. sin 35°

7. tan 90°

8. cos 12.4°

9. cos 0°

10. tan 270°

11. cos 80°7'

12. sin 87°7'52"

13. sec Q = .697

14. cot F = 0.083

15. csc V = .105

16. sec D = 4.55

17. cot 3°

18. csc 193°

19. csc 0°

20. csc 254°10'

21. sec 0°

22. cot 245°

23. sec 88°37'

24. csc 37'12"

25. tan T = 0.147

26. sin M=0.807

27. tan Z = 1

28. cos X = 0

29. tan H = 0.381

30. sin T = 0

31. sin L = 1.004

32. tan K = 0

33. cos P = 1.53

34. cos N = 3

35. sin Y = 0.500

36. cos R = 0.250

37. sec Q = .697

38. cot F = 0.083

39. csc V = .105

40. sec D = 4.55

41. cot 3°

42. csc 193°

43. csc 0°

44. csc 254°10'

45. sec 0°

46. cot 245°

47. sec 88°37’

48. csc 37’12”

49. tan T = 0.147

50. sin M=0.807

51. tan Z = 1

52. cos X = 0

53. tan H = 0.381

54. sin T = 0

55. sin L = 1.004

56. tan K = 0

57. cos P = 1.53

58. cos N = 3

59. sin Y = 0.500

60. cos R = 0.250

61. cot T = 0.006

62. csc M = 1.833

63. cot Z = 1

64. sec X = 5

65. cot H = 0.381

66. sec T = 0

67. sec L = 1

68. cot K = 0

69. sec P = 3.60

70. sec M = 0.999

71. csc Y = 1

72. sec R = 1.008

73. sin 54°

74. tan 8.3°

75. cot 75°40"

Trigonometry Unit				Day 3
Daily Objective	The students will complete a right triangle in degrees.	**Ohio Content Standards**		
Materials Needed		12.4	Use trigonometric relationships to determine lengths and angle measures.	
	Worksheet number 2			

Activities	**Time Allotted**
Presentation on Pythagorean Theorem and completing right triangles in degrees	30 min
Begin Worksheet# 2	10 min

Journal Prompt	Assessment

Notes

NAME:_________________________ DATE:____________ SCORE:__________

Worksheet #2 **No calculator allowed.**

Use the unit circle to complete the table for each angle. Give answers in exact form.

1) $270°$

sin Ø = **cos Ø =** **tan Ø =**

cot Ø = **sec Ø =** **csc Ø =**

2) $\frac{7\pi}{6}$

sin Ø = **cos Ø =** **tan Ø =**

cot Ø = **sec Ø =** **csc Ø =**

3) $-240°$

sin Ø = **cos Ø =** **tan Ø =**

cot Ø = **sec Ø =** **csc Ø =**

Match each function below with its graph. If no match, write NM.

1) ________ $y = \sin x$

2) ________ $y = \cos x$

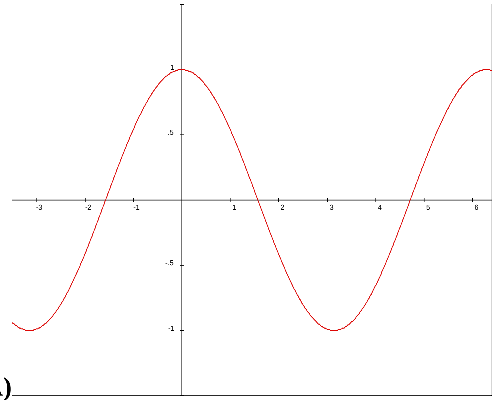
3) ________ $y = \tan x$

4) ________ $y = \sec x$

5) ________ $y = \csc x$

6) ________ $y = \cot x$

A)



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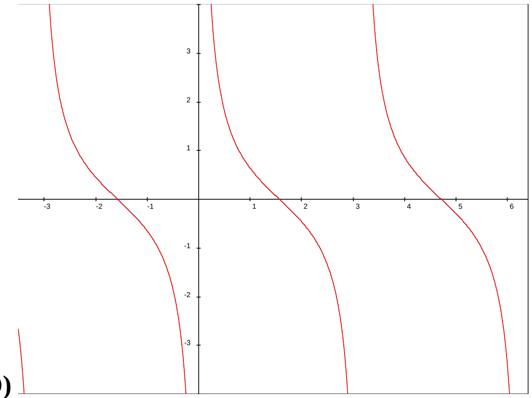

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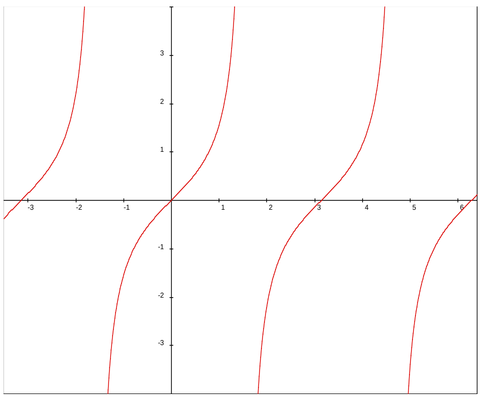

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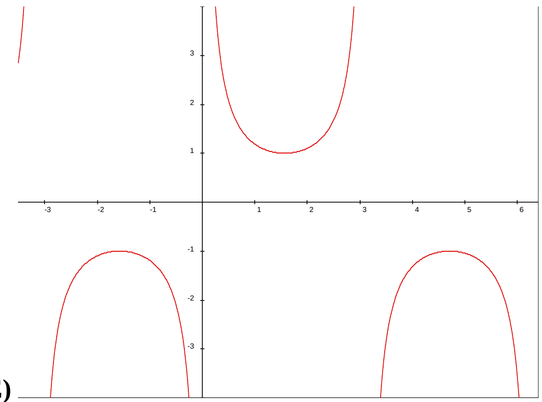

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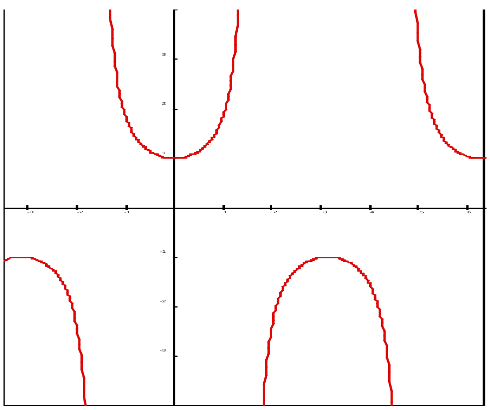

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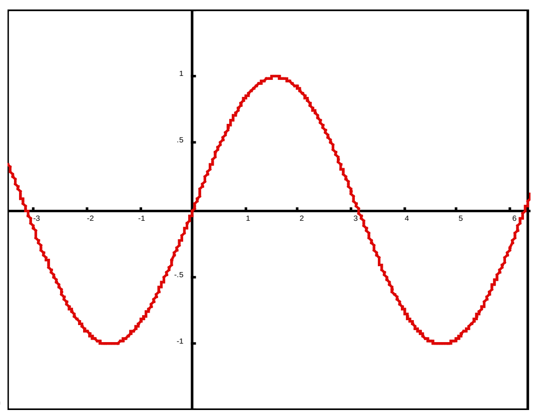


Trigonometry Unit	Day 4

Daily Objective	Students will be assessed as to their understandings of the concepts presented.

Ohio Content Standards	

Materials Needed	
	Keys for the worksheets # 1 and # 2
	Quiz # 1

Activities	Time Allotted
Go over worksheets # 1 and # 2	15 min
Quiz # 1	15 min
Journal Prompt # 1	10 min

Journal Prompt	Assessment
Describe how to complete a right triangle using Pythagorean theorem.	Quiz over worksheets # 1 and # 2

Notes

Name:__________________________

Change from Decimal Degrees to DMS or DMS to Decimal Degrees.

1) 30.6°

2) 55°12'30"

3) 90.025°

4) 57°40'

5) 430.01°

6) 45°49'12"

7) 20°22'

8) 63.45°

Write final answers under each problem. Find angles in degrees (to tenths) and trig values to three significant digits.

9) sin 20°

10) tan 5.1°

11) cos 90°

12) sin 87°7'52"

13) sin A = .146

14) tan B = 23.3

15) cos M = .021

16) sin W = 3.05

17) csc 45°

18) cot 85°22'

19) sec 90°

20) cot 73.5°

21) sec Q = .697

22) cot F = 0.083

23) csc V = .105

24) sec D = 4.55

Trigonometry Unit				Day 5
Daily Objective	Students will use the class time to work toward the completion of the unit project.	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
Students work on the various aspects of the unit project.	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit	Day 6

Daily Objective	Students will use the right angle trig functions to complete problems set in the real world.	**Ohio Content Standards**	
Materials Needed		12.4	Use trigonometric relationships to determine lengths and angle measures.

Activities	**Time Allotted**
Present how to solve problems set in the real world.	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit				Day 7
Daily Objective	Students will use the right angle trig functions to complete problems set in the real world.	**Ohio Content Standards**		
		12.4	Use trigonometric relationships to determine lengths and angle measures.	
Materials Needed				
	Worksheet # 3			

Activities	**Time Allotted**
Worksheet # 3	40 min

Journal Prompt	Assessment

Notes

Angles of Depression and Elevation

1. From a point 115 feet from the base of a redwood tree, the angle of elevation to the top of the tree is 64.3o. Find the height of the tree to the nearest foot.

2. From a point 10 feet from the base of a flag pole, the angle of elevation to the top of the flag pole is 67.4o. Find the height of the flag pole to the nearest foot.

3. DME (Distance Measuring Equipment) is standard avionic equipment on a commercial airplane. This equipment measures the distance from a plane to a radar station. If the distance from a plane to a radar station is 160 miles and the angle of depression is 33o, find the number of ground miles from a point directly below the plane to the radar station.

4. If the distance from a helicopter to a tower is 300 feet and the angle of depression is 40.2o, find the distance on the ground from a point directly below the helicopter to the tower.

5. A backpacker notes that from a certain point on level ground, the angle of elevation to a point at the top of a tree is 34o. After walking 50 closer to the tree, the backpacker notes that the angle of elevation is 54o. Find the height of the tree.

6. The angle of elevation from a point 116 meters from the base of the Eiffel Tower to the top of the Tower is 68.9o. Find the approximate height of the tower.

7. A submarine traveling 9 mph is descending at an angle of depression of 5o. How many minutes does it take the submarine to reach a depth of 80 feet?

8. The angle of depression of one side of a lake, measured from a balloon 2500 feet above the lake is 43o. The angle of depression to the opposite side of the lake is 27o. Find the width of the lake.

9. From a point A on a line from the base of the Washington Monument, the angle of elevation to the top of the monument is 42o. From a point 100 feet away and on the same line, the angle to the top is 37.8o. Find the approximate height of the Washington Monument.

10. The angle of elevation to the top of the Egyptian pyramid Cheops is 36.4o, measured from a point 350 feet from the base of the pyramid. The angle of elevation of a face of the pyramid is 51.9o. Find the height of Cheops.

Trigonometry Unit				Day 8
Daily Objective	Students will use the class time to work toward the completion of the unit project.	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
Students work on the various aspects of the unit project.	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit				Day 9
Daily Objective	Students will use the class time to work toward the completion of the unit project.	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
Students work on the various aspects of the unit project.	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit				Day 10
Daily Objective	Students will demonstrate their knowledge of right angle trig	**Ohio Content Standards**		
Materials Needed	Assessment			

Activities	**Time Allotted**
Assessment over right angle trig.	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit				Day 11
Daily Objective	Students will covert between degrees and radians. Students will use a calculator to do radian trig.	**Ohio Content Standards**		
		11.2	Use radian and degree angle measures to solve problems and perform conversions as needed.	
Materials Needed	Worksheet # 4			

Activities	**Time Allotted**
Presentation of how to convert between degrees and radians, and how to use a calculator to do radian trig.	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit
Worksheet #4

Part I: Change degree to radians and radians to degrees.

1) $30.6°$	2) 1.000	3) $90.5°$	4) 3.1416
5) $57°40'$	6) $5°59'\,2''$	7) 3π	8) $\pi/2$
9) $\pi/6$	10) 0.500	11) $20°22'$	12) $63.45°$
13) $31°55'9''$	14) $7\pi/12$	15) $180°$	16) $2\pi/3$
17) $\pi/5$	18) $57°$	19) $10°10'$	20) 2.300

Part II: DO NOT USE A CALCULATOR—USE THE UNIT CIRCLE TO FIND THE SIX TRIG FUNCTIONS

1) $30°$	2) $330°$	3) $90°$	4) $225°$
5) $\pi/4$	6) $\pi/2$	7) $\pi/6$	8) $2\pi/3$
9) $-60°$	10) $-135°$	11) $-210°$	12) $-360°$
13) $-\pi/4$	14) $-5\pi/6$	15) $-5\pi/4$	16) $-7\pi/4$

Trigonometry Unit				Day 12
Daily Objective	Students will covert between degrees and radians. Students will use a calculator to do radian trig.	**Ohio Content Standards**		
		11.2	Use radian and degree angle measures to solve problems and perform conversions as needed.	
Materials Needed				
	Worksheet # 4			

Activities	**Time Allotted**
Worksheet # 4	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit				Day 13
Daily Objective	Students will use the class time to work toward the completion of the unit project.	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
Students work on the various aspects of the unit project.	40 min

Journal Prompt	Assessment

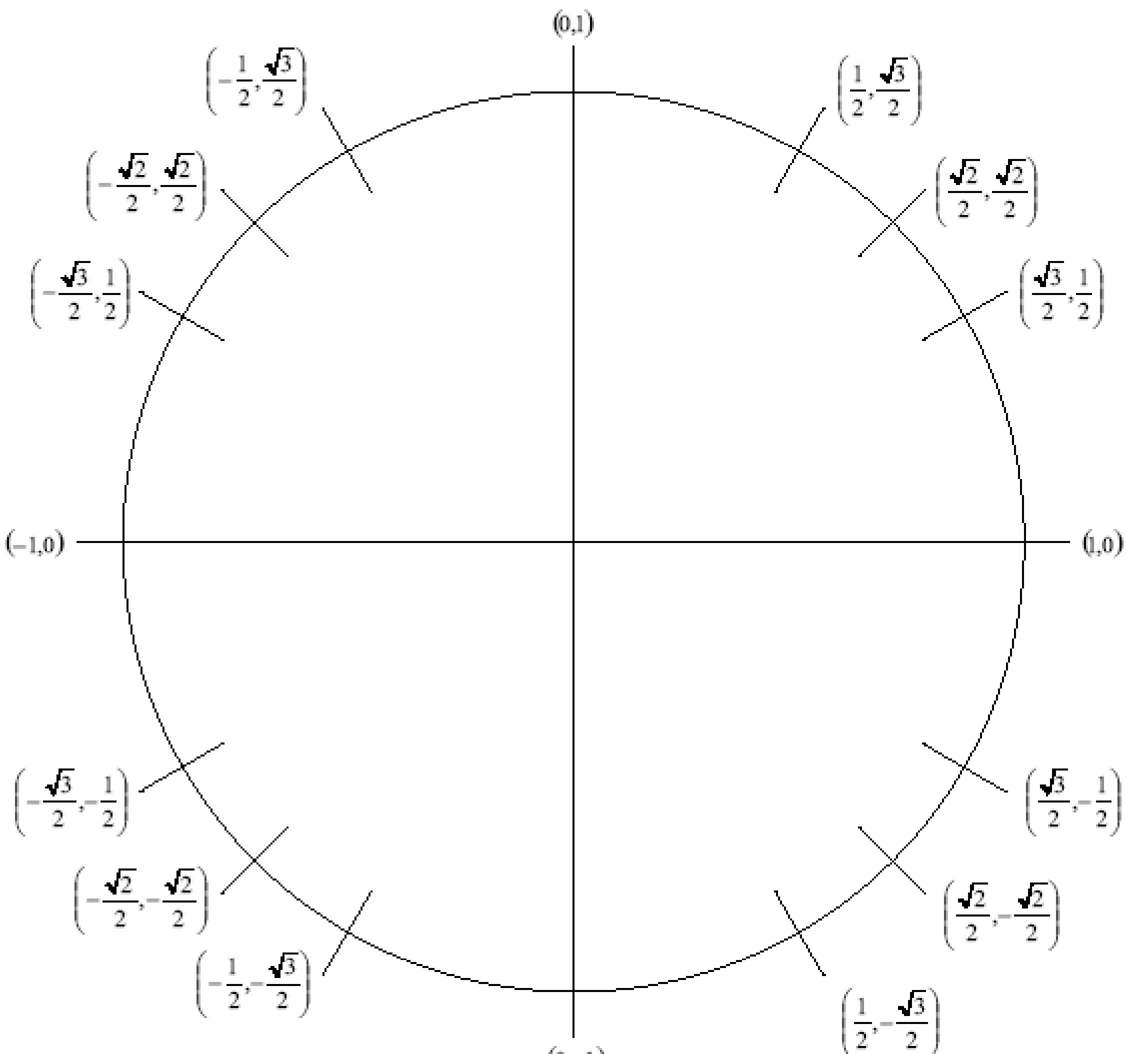
Notes

Trigonometry Unit				Day 14
Daily Objective	Students will use a unit circle to find the six trig functions.	**Ohio Content Standards**		
Materials Needed	Worksheet # 5	11.2	Use radian and degree angle measures to solve problems and perform conversions as needed.	

Activities	**Time Allotted**
Presentation on the unit circle.	25 min
Worksheet # 5	15 min

Journal Prompt	Assessment

Notes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$(1,0)$
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$\left(\frac{\sqrt{2}}{2},-\frac{\sqrt{2}}{2}\right)$
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$(-1,0)$
$\left(-\frac{\sqrt{3}}{2},\frac{1}{2}\right)$
$\left(-\frac{\sqrt{2}}{2},\frac{\sqrt{2}}{2}\right)$
$\left(-\frac{1}{2},\frac{\sqrt{3}}{2}\right)$

Trigonometry Unit
Worksheet #5

DO NOT USE A CALCULATOR—USE THE UNIT CIRCLE TO FIND THE SIX TRIG FUNCTIONS

1) $30°$ 2) $330°$ 3) $90°$ 4) $225°$

5) $\pi/4$ 6) $\pi/2$ 7) $\pi/6$ 8) $2\pi/3$

9) $-60°$ 10) $-135°$ 11) $-210°$ 12) $-360°$

13) $-\pi/4$ 14) $-5\pi/6$ 15) $-5\pi/4$ 16) $-7\pi/4$

Trigonometry Unit				Day 15
Daily Objective	Students will use a unit circle to find the six trig functions.	**Ohio Content Standards**		
Materials Needed	Worksheet # 5	11.2	Use radian and degree angle measures to solve problems and perform conversions as needed.	

Activities	**Time Allotted**
Worksheet # 5	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit				Day 16
Daily Objective	Students will use the class time to work toward the completion of the unit project.	**Ohio Content Standards**		
Materials Needed				

Activities	**Time Allotted**
Students work on the various aspects of the unit project.	40 min

Journal Prompt	Assessment

Trigonometry Unit				Day 17
Daily Objective	Students will find reference angles. Students will graph the six trig functions.	**Ohio Content Standards**		
		11.2	Use radian and degree angle measures to solve problems and perform conversions as needed.	
Materials Needed				
	Worksheet # 6			

Activities	**Time Allotted**
Presentation of how to find reference angles.	25 min
Show students how to develop graphs of trig functions.	15 min

Journal Prompt	Assessment

Notes

Reference Angles – Worksheet #6

Name:____________________

Part 1: Find the reference angle for the given angle. After finding the reference angle, find the four angles in $[0°, 360°)$, one in each quadrant, that has the same reference angle

	Given Angle θ	Reference Angle θ'	QI	QII	QIII	QIV
Example	–132°	48°	48°	132°	228°	312°
1	97°					
2	283°					
3	17°					
4	–194°					
5	149°					
6	260°					
7	610°					
8	–29°					
9	86°					
10	–355°					

Part 2: Find two solutions in $[0°, 360°)$ for each of the following.

	Given Equation	Two solutions in the interval $0° \le \theta < 360°$
Example	$\sin\theta = -0.271$ $\theta = -16°$ $\theta' = 16°$	All solutions will have a $16°$ reference angle. The sine value must be negative, so solutions will be in QIII or QIV $\theta = \{196°, 344°\}$
1	$\tan\theta = 2.97$	
2	$\cos\theta = 0.271$	
3	$\sec\theta = -3.79$	
4	$\cos\theta = -0.974$	
5	$\sin\theta = 00257$	
6	$\tan\theta = -0.909$	
7	$\sin\theta = -0.882$	
8	$\csc\theta = 4.32$	

Trigonometry Unit				Day 18
Daily Objective	Students will find reference angles. Students will graph the six trig functions.	**Ohio Content Standards**		
Materials Needed		11.2	Use radian and degree angle measures to solve problems and perform conversions as needed.	
	Worksheet # 6			

Activities	**Time Allotted**
Worksheet # 6	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit	Day 19

Daily Objective	Students will use the class time to work toward the completion of the unit project.

Ohio Content Standards

Materials Needed	

Activities	Time Allotted
Students work on the various aspects of the unit project.	40 min

Journal Prompt	Assessment

Notes

Trigonometry Unit				Day 20
Daily Objective	Students will demonstrate their knowledge of right angle trig	**Ohio Content Standards**		
Materials Needed	Assessment			

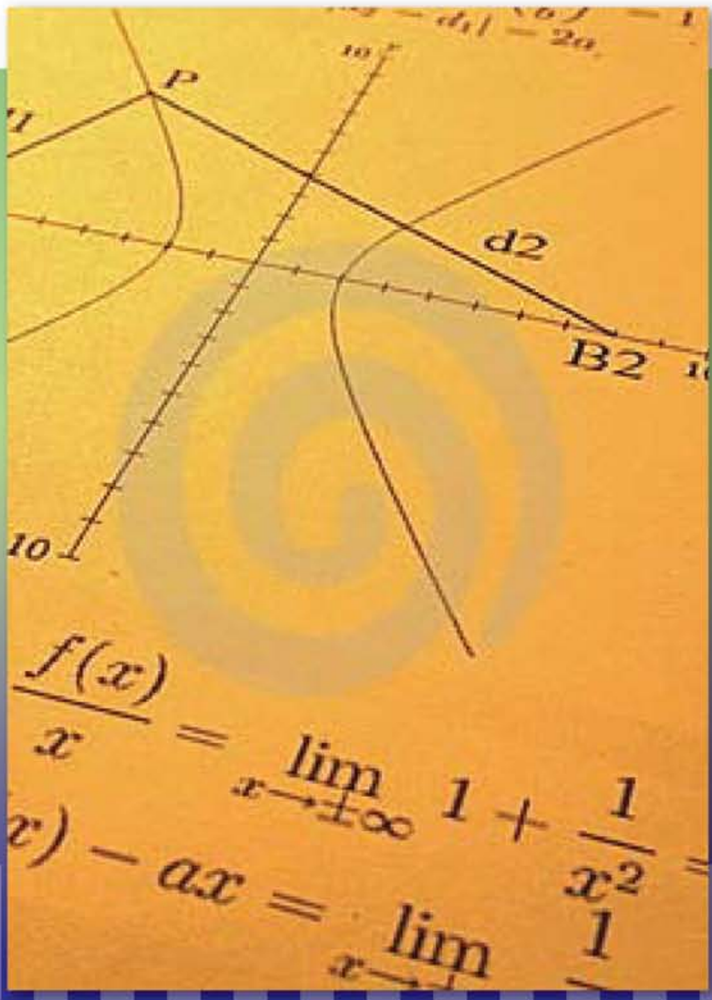
Activities	**Time Allotted**
Assessment over unit circle trig.	40 min

Journal Prompt	Assessment

Notes

Policy & Evaluation

Senior Math Course



Student Assessment Policy

In order to measure the progress of each student in the course and to measure the effectiveness of preparing student for success in postsecondary mathematic coursework, the following procedures will be used:

- *Pretests*
- *Post Tests*
- *Teacher observation and evaluation*
- *Notebooks*
- *Portfolio*
- *Class discussions*
- *Skill testing*
- *Project development*
- *Daily grades*
- *Lab performance*
- *Board-adopted rules and regulations for early placement*
- *Industry certifications that students can achieve (name them)*

Measurement of learning will be an ongoing activity with emphasis on laboratory activities and competency improvement. Evaluation will be accomplished through pre-assessment of student's skills, frequent formative assessment, both visual and written, and summative evaluation to determine the mastery of competencies. Formative assessments that are conducted during instruction help the teacher make necessary instructional adjustments. The instructor may decide to alter instructional materials and methods if students are experiencing difficulties in learning what is being taught. All evaluations are in the form of points received out of points possible. A percentage is then calculated and a letter grade is assigned. Progress reports on all students are mailed to parents on mid-term of each grading period.

Insert your district's grading scale

SECTION 7: UNIT EVALUATION

The team that developed this unit would appreciate your reflection on **the unit** that you just used, by answering the following questions and faxing this to our office.

Name of the Unit: ____

Your Name: (optional) ____

Your School: ____

City, State, Zip: ____

Briefly, tell us about the class that this unit was used, such as level, type of school, school district:

Please tell us about the following by circling the number that best describes each item:

Organization of content:

Very Poor	Poor		Good		Very Good		Excellent		Exceptional	
0	1	2	3	4	5	6	7	8	9	10

Level of rigor for college prep work:

Very Poor	Poor		Good		Very Good		Excellent		Exceptional	
0	1	2	3	4	5	6	7	8	9	10

Completeness of materials for lesson:

Very Poor	Poor		Good		Very Good		Excellent		Exceptional	
0	1	2	3	4	5	6	7	8	9	10

Ability to implement lesson based on materials provided:

Very Poor	Poor		Good		Very Good		Excellent		Exceptional	
0	1	2	3	4	5	6	7	8	9	10

What could be added or revised to make the material in this unit better for the students and the teacher

Thank you for taking the time to help us improve this material.

Please fax this sheet to 419-530-7240. You can also email me at james.jennings@utoledo.edu