

Mastery Review from 2nd Quarter

1. A card is drawn from a 52-card deck. What is the probability of NOT drawing a face card or a spade?

2. A bag of marbles contains 6 white marbles, 4 red marbles, 7 green marbles and 8 black marbles. What is the probability of reaching in a getting a green marble then a white marble without replacing the first marble?

3. A math club contains 42% females. Of the females, 79% are taking Geometry and the rest are taking Algebra 2. 38% of the males are taking Algebra 2, and the others take Geometry.
 - A) Create a tree diagram to represent the information given.

 - B) What is the probability of a male that is taking geometry?

 - C) What is the probability of a student in the math club taking Algebra 2?

 - D) What is the probability of a student being a male, given a student that takes Geometry?

4. Bob wants to buy a new Ipod. He can choose from 5 colors, 3 different types of memory, and 2 types of headphones. How many ways can Bob choose an Ipod?

5. A sports team consists of 16 players. The coach needs to assign a Captain, Co-Captain and a Team Assistant. How many ways can the coach determine these positions?

6. There is a relationship between the radius of an orbit and the time of one orbit for the moons of Saturn. The table below lists data for 11 of Saturn's 30 moons. Round answers to the hundredths place.

Moon	Atlas	Prometheus	Pandora	Epimetheus	Janus	Mimas	Enceladus	Tethys	Dione	Helene	Rhea
Radius (100,000 km)	1.38	1.39	1.42	1.51	1.51	1.86	2.38	2.95	3.77	3.77	5.27
Time (days)	0.60	0.61	0.63	0.69	0.70	0.94	1.37	1.89	2.74	2.74	4.52

- a. Find the power function model for the data for orbital time versus radius. _____

- b. Predict the orbital radius of Titan, which has orbit time of 21.277 days. _____

- c. Find the orbital time for Phoebe, which has an orbit radius of 12,952,000 km. _____

Solve the following. Show all your work! Use separate paper, if needed.

7.
$$\frac{x+3}{x} - \frac{7}{x+2} = \frac{14}{x^2+2x}$$

8. Solve the following equation: $3x^3 = 48x$

9. The current I in an electrical conductor varies inversely with the resistance R of the conductor. The current is $\frac{1}{3}$ amps when the resistance is 360Ω . Use this information to write an equation to model the relationship.

10. Explain how the function has changed from the parent graph. $f(x) = -\sqrt{x+8} - 5$

11. For the function $y = -3 + 2\cos(4x)$, find:

- The amplitude
- The period
- The equation of the midline
- Graph one period in the negative and positive directions.

12. A building 200 feet tall casts a 95 foot long shadow. If a person looks down from the top of the building, what is the measure the angle of depression? (Assume the person's eyes are level with the top of the building.)

13. Find all solutions to $2\sin(2x) + 1 = 0$.

14. Find the measure of the indicated angle to the nearest degree.



15. Solve triangle ABC if angle $B = 45$ degrees, $a = 28$, and $b = 27$.

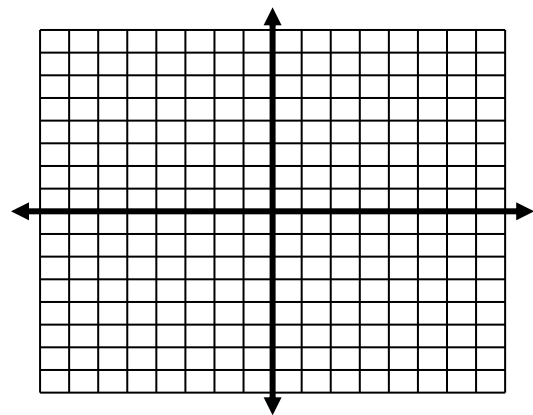
16. When placing an order of candy from an online store, you have to choose from 10 different flavors of candy. Each order must contain at least 4 different types of candy. How many ways can you place an order?

17. We use 10 digits in our number system. How many 5-digit "numbers" can be formed if no digits are repeated and zero is not allowed in the first position?

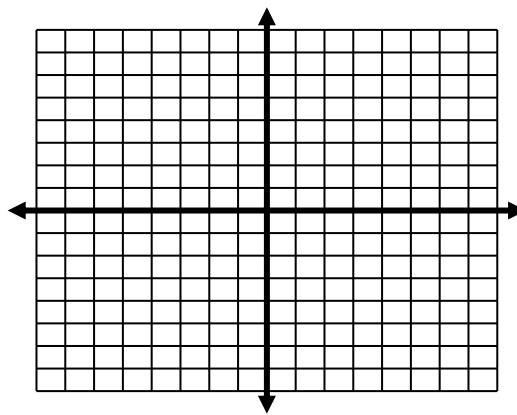
18. A bag contains 26 tiles with a letter on each, one tile for each letter of the alphabet. What is the probability of reaching into the bag and randomly choosing a tile with one of the first 10 letters of the alphabet on it or randomly choosing a letter with a vowel?
19. At a local high school, the probability that a student takes Biology and Chemistry is 16%. The probability that a student takes Chemistry is 42%. What is the probability that a student takes Biology, given that the student takes Chemistry?
20. There are 6 women and 7 men trying out for 3 positions on the TV show Survivor.
- In how many ways can the 3 positions be filled?
 - In how many ways can the positions be filled if all women are hired?
 - In how many ways can the positions be filled if 2 women and 1 man are hired?

For each equation, draw a graph, indicating at least 5 points. Then tell its domain, its range, and other requested information.

21.
$$g(x) = \begin{cases} 5 & \text{if } x \leq -2 \\ 3x - 2 & \text{if } x > -2 \end{cases}$$



22.
$$f(x) = 2|x - 3| - 4$$



D: _____ R: _____

$g(-4) =$ _____ $g(3) =$ _____

$g(-2) =$ _____ $g(0) =$ _____

D: _____ R: _____

Changed from parent: _____

$f(-2) =$ _____ $f(0) =$ _____

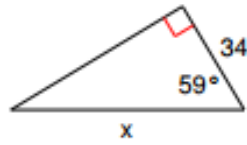
23. Write an equation for the translation of $y = \frac{5}{x}$ that has the asymptotes $x = -2$ and $y = -8$.

Solve the following. Show all your work! Use separate paper, if needed.

24. $\sqrt{3x+7} = x-1$

25. $(2x + 3)^{3/4} - 2 = 6$

26. Find the measure of x .



27. Find the area of triangle ABC if angle $C = 30$ degrees, $b = 6$, and $a = 8$.

28. Given triangle ABC , find angle B if angle $A = 143$ degrees, $c = 22$, and $b = 17$.

29. Solve triangle ABC if angle $A = 70$ degrees, $c = 26$, and $a = 25$.

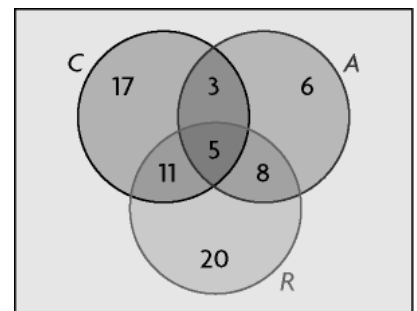
30. Solve triangle ABC if $a = 10$, $b = 17$, and $c = 11$.

31. Given $g(x) = 3x^2 - x$ and $h(x) = 5x + 1$, evaluate $g(x + 2) - 4h(x)$.

32. If x varies directly as the cube root of y , and $x = 6$ when $y = 27$, find x when $y = 64$.

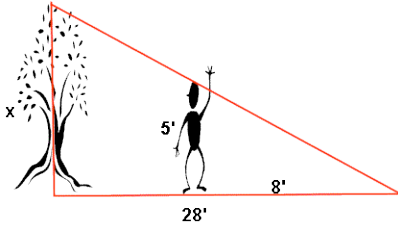
33. A summer camp offers canoeing, rock climbing, and archery. The following Venn diagram shows the types of activities the campers like.

- a) Find the probability that a camper likes canoeing and archery.
- b) Find the probability that a camper likes rock climbing or canoeing.
- c) Find the probability that a camper does not like archery.



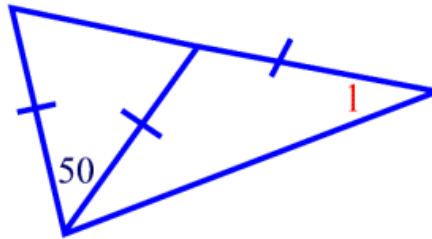
Mastery Review from 1st Quarter

1. At a certain time of the day, the shadow of a 5' boy is 8' long. The shadow of a tree at this same time is 28' long. How tall is the tree?



2. Find x and y if $\triangle ABC \sim \triangle PQR$,
 $m\angle R = 10x + 140$, $m\angle C = 48x - 50$,
 $m\angle P = 8y - 9$, $m\angle A = x + y$.
3. Given that H is between J and K , $JK = 71$,
 $JH = 7x - 13$, and $HK = 4x + 7$, find the value
of x , the length of JH , and the length of HK .

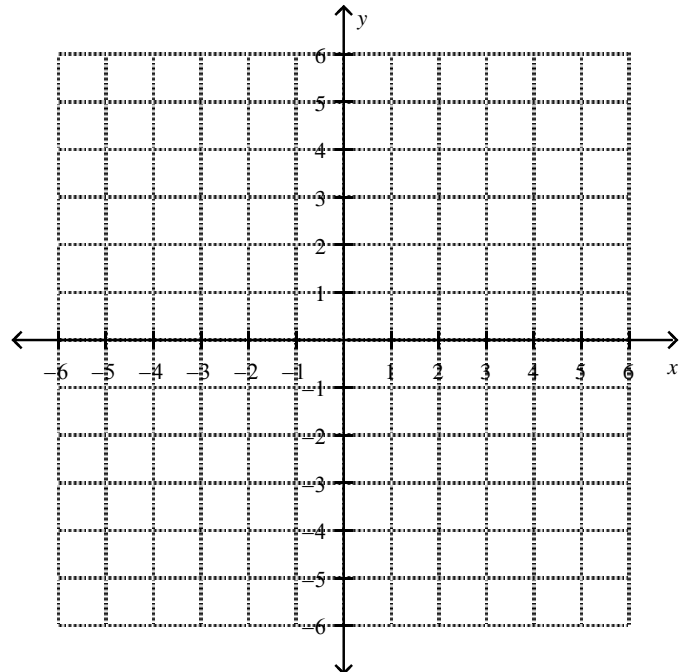
4. Find the measure of Angle 1 in the figure below.



5. The vertices of a triangle are $D(-2, 3)$, $E(-2, -4)$ and $F(5, -4)$. Graph and label the image with a reflection over the line $y = -x$. Name the image vertices below.

D' _____ E' _____ F' _____

Write the algebraic rule for a reflection over $y = -x$.



6. Sketch the graph of the function on a separate piece of paper. $y = x^2 + 15x + 54$
- Find the x -intercepts.
 - Find the axis of symmetry.
 - Find the vertex.
 - Find the y -intercept.
 - Is the vertex a max or a min?
7. Find the equation of a function with intercepts at $(-5, 0)$ and $(9, 0)$ and a vertex at $(1, 10)$

Find the discriminant and tell the number/type of solutions.

8. $16b^2 - 40b + 25 = 0$

9. $x^2 - 4x + 24 = 0$

10. $6k^2 + 5k - 6 = 0$

11. Solve: $6 - \sqrt[3]{1 - 7u} = 2$

12. Solve the equation $25^{2x+1} = 144$

13. In 2005, a baseball card bought for \$50 increased at a rate of 3.4% per year.
- Write an exponential function that models the value of the baseball card.
 - Write a recursive (NOW-NEXT) function to model the data.
 - Find the value of the baseball card in 2013.
 - In what year will the baseball card be worth \$120?

14. A car's original value when purchased was \$18,000. Five years later, it was worth \$7,500. Find an exponential equation to model the information. Then, find the value of the car ten years after the purchase.

15. Find the inverse of

a. $f(x) = \sqrt{x-6}$.

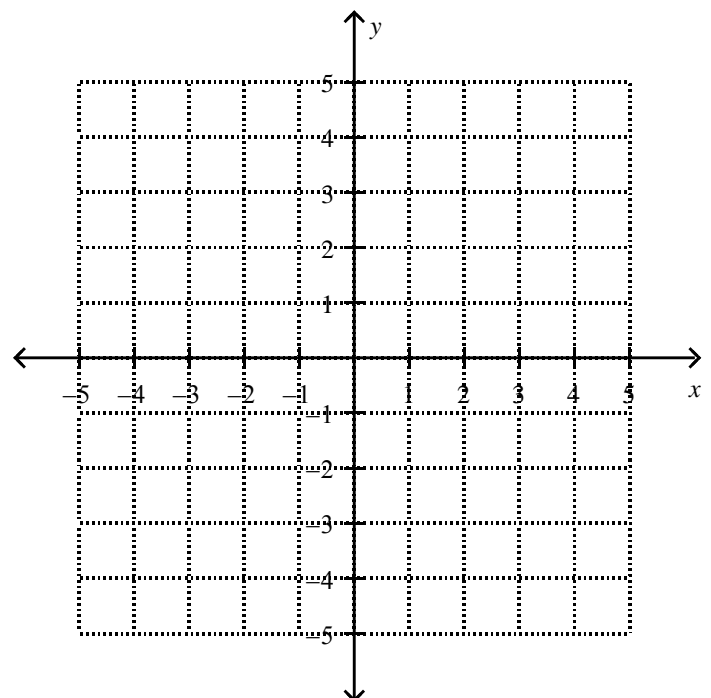
b. $y = 4x + 7$.

16. Graph and label the points J(-3, 4), K(-2, 2), L(1, 1) and M(4, 2) and then rotate the figure 270°. Graph and label the image points, and write their coordinates below. Then, write the algebraic rule for the transformation.

J' _____ K' _____

L' _____ M' _____

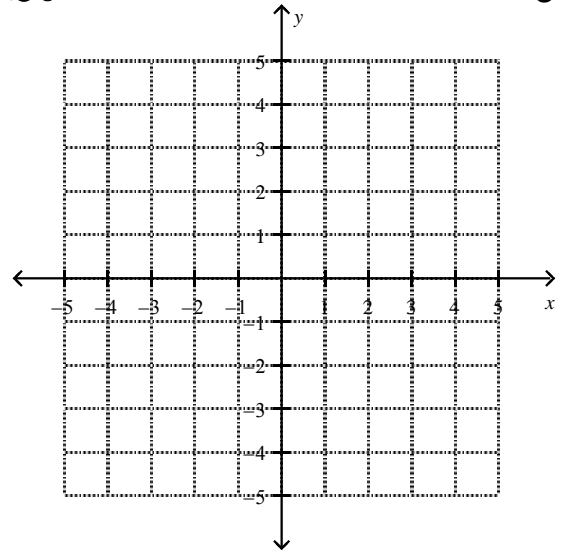
Write the algebraic rule for the rotation 270°:



17. Graph $\triangle ABC$ with $A(4, -3)$, $B(5, 1)$, and $C(2, 2)$, then graph the image of $\triangle ABC$ after the translation $(x, y) \rightarrow (x - 3, y + 2)$, then a reflection over the x -axis.

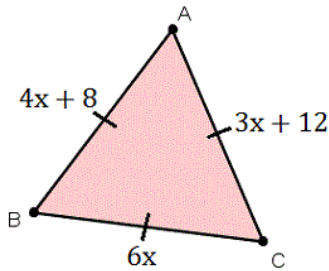
Label all your points then, write the coordinates of the final image below.

Image _____

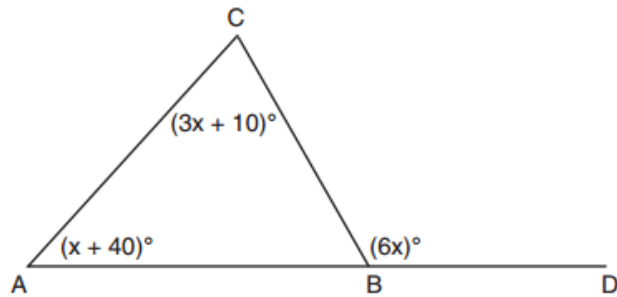


18. $\triangle SAM \cong \triangle LET$. If $SA = x^2 - 4x$, $LE = 5x - 18$ and $ET = 24$. Find SA .

19. Find the value of x .



20. Find the value of x .



21. Describe how the parabola $y = -(x - 5)^2 + 6$ is changed from $y = x^2$.

Factor and find the solutions.

22. $2v^2 + 5v + 2 = 0$

23. $5a^2 - 18a + 9 = 0$

Factor and find the solutions.

24. $4b^2 - 35b + 49 = 0$

25. The following function models how much money, v , a certain company makes after a certain amount of time, t . At what time did they make the least amount of money?

$$v(t) = 5000 + 360t - 12t^2$$

26. Iodine-131 is used to find leaks in water pipes. It has a half life of 8.14 days.

a. Write an exponential function for a 200 mg sample.

b. Find the amount of iodine-131 remaining after 72 days.

27. On a separate sheet of graph paper, graph and compare $f(x) = 3^x$ and $g(x) = 3^{x+2} - 7$. Label each graph. Determine the domain, range, and asymptote of $g(x)$.

28. The value, V , of a car can be modeled by the function $V(t) = 15,000(0.78)^t$, where t is the number of years since the car was purchased. To the nearest tenth of a percent, what is the monthly rate of depreciation?

29. Solve $\sqrt{2x+4} = 3 + \sqrt{x-5}$

30. Simplify

$$\left(\frac{16x^{\frac{1}{4}}y^{-12}}{x^{\frac{-1}{4}}y^6} \right)^{\frac{4}{3}}$$

Unit 4 Review

Solve the equations.

1) $\sqrt{2x - 5} = 6$

2) $\sqrt[3]{x - 10} - 7 = -5$

3) $\frac{2}{g+2} = \frac{-1}{g-8}$

4) $\frac{5}{6w} + \frac{1}{w} = -4$

5) $6x = \sqrt{24 + 12x}$

6) A period of a pendulum is the time required for one oscillation. An experiment is conducted in which pendulums are created with different lengths, l , and the corresponding periods are recorded.

a. Enter the data in the table below in your calculator to find a power regression equation.

Length (ft)	1	2	3	4	5
Time (sec)	1.1	1.55	1.89	2.24	2.51

b. If the pendulum has a length of 8.2 feet, what is the period of the pendulum?

8) Graph and state the vertical and horizontal asymptotes for the following function: $f(x) = \frac{4}{x-5} + 2$

9) Factor each of the following completely:

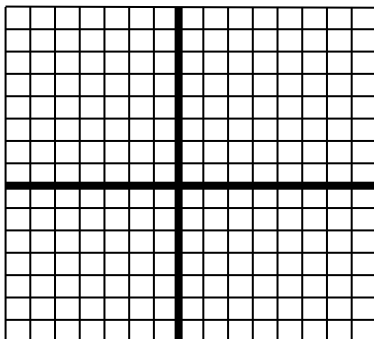
a. $x^2 - 36$

b. $4x^3 - 6x^2 + 16x - 24$

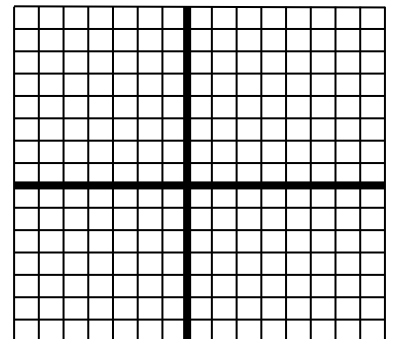
c. $2x^4 - 32$

For questions 10-11, graph and state the transformation(s) from the parent function.

10) $y = \sqrt{x+3}$

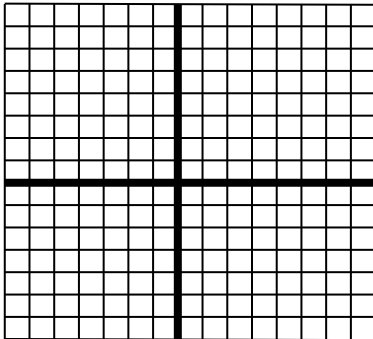


11) $y = \sqrt[3]{x-1} - 2$

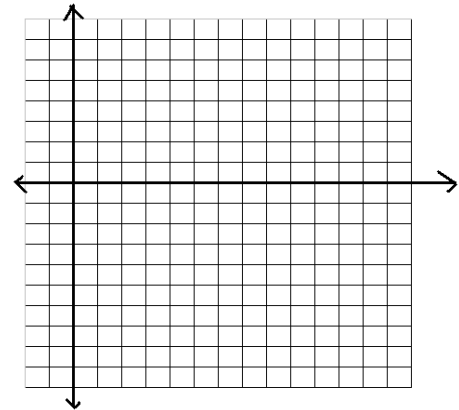


For questions 12-13, graph and state the transformation(s) from the parent function.

12) $y = -|x + 5|$



13) $f(x) = \begin{cases} \frac{1}{2}x + 1, & x < 3 \\ 4, & x \geq 3 \end{cases}$



14) A drama club is planning a bus trip to New York City to see a Broadway play. The cost per person for the bus rental varies inversely as the number of people going on the trip. It will cost \$50 per person if 45 people go on the trip. How much will it cost per person if 60 people go on the trip? Round any answers to the nearest cent.

15) The velocity of sound in air is given by the equation $v = 20\sqrt{273 + t}$, where v is the velocity in meters per second and t is the temperature in degrees Celsius. Find the temperature when the velocity of sound in air is 318 meters per second. Round the answer to the nearest degree.

16) Given $g(x) = 4|x - 3| - 2$ and parent graph $f(x) = |x|$

- a) Describe the transformations of $g(x)$ from $f(x)$. (Remember to be specific!)

- b) In interval notation, where is $g(x)$ increasing?

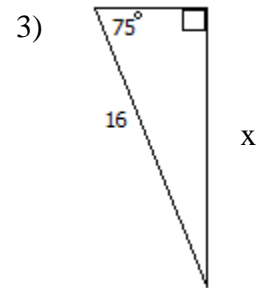
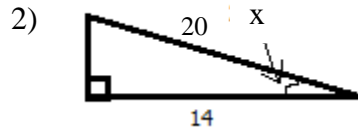
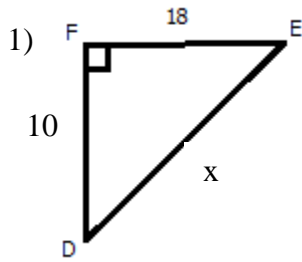
- c) In interval notation, where is $g(x)$ decreasing?

- d) In interval notation, what is the domain of $g(x)$?

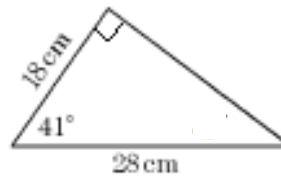
- e) In interval notation, what is the range of $g(x)$?

Unit 5 Review

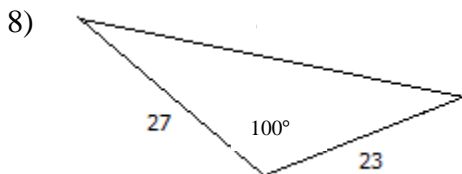
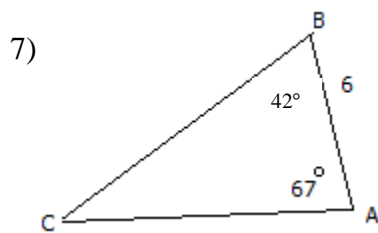
Solve for the missing variable in the following triangles. Round your answers to the nearest tenths.



- 4) A park ranger is watching a bear from the top of a 14 m tower. If the angle of depression to the bear is 62° , what is the distance from the bear to the base of the tower?
- 5) A girl 5.5 ft tall holds a string that is 50 ft. and is attached to a kite. If the string makes an angle of elevation of 57° , how high is the kite off of the ground? Round to the nearest tenths.
- 6) Find the area of the triangle at the right. Round you answer to tenths.



For problems 12-13, find all missing side lengths and angle measures in the given triangle. Round angles to whole degrees and sides to hundredths. *Label your answers for angles and sides clearly.*



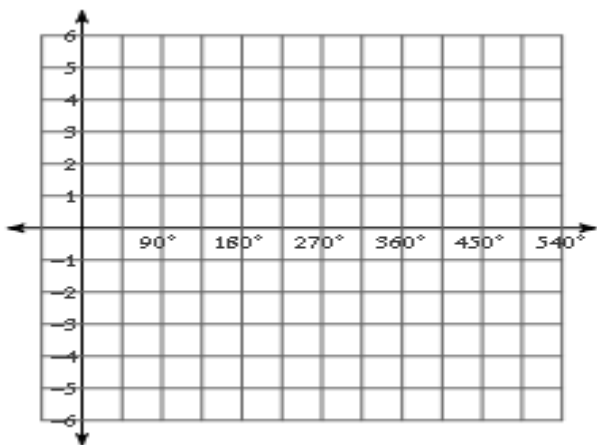
9) Determine if the triangle is acute, right or obtuse, if the sides are lengths 8, 18, 19.

10) State the amplitude, period, and midline for the following function: $y = 3\cos(x) - 1$

Amplitude: _____ Period: _____ Midline: _____

11) Graph the following trig function. Where is the graph decreasing? _____
 increasing? _____ positive? _____ negative? _____

$y = 5\sin(x)$



12.) Write the equation for the following graph. _____

What is the amplitude? _____ What is the midline? _____

