

DUE: August 8, 2022

This assignment is for students who have completed Geometry or Geometry Honors and are taking Algebra II CP in the 2022-2023 school year.

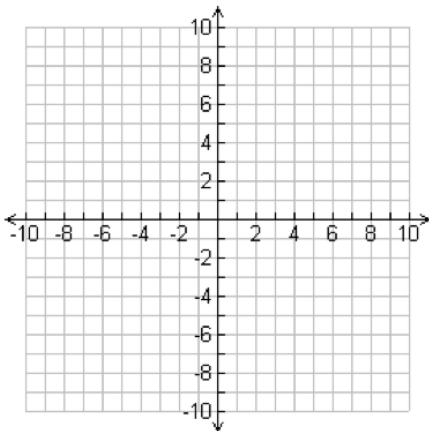
Did you read the instructions? _____

What math are you taking in the 2022-2023 school year? _____

The expectation of the Math Department at Archbishop Hannan High School is that its students become Tenacious Problem Solvers! Thus, as you work on these problems be sure and document your strategies, your mathematical explanations, any drawings, tables or graphs that you use, and the best, complete answer you can find. We hope that you are challenged by these problems and enjoy them. We look forward to the discussion of these problems that we will have in the first weeks of school. Come prepared to defend your solution!

1. Two iron rails, each 50 feet long, are laid end to end with no space between them. During the summer, the heat causes each rail to increase in length by 0.04 percent. Although this is a small increase, the lack of space at the joint makes the joint buckle upward. What distance upward will the joint be forced to rise? [Assume that each rail remains straight, and that the other ends of the rails are anchored.]

2. Give an example of a point that is the same distance from $(3,0)$ as it is from $(7,0)$. Find lots of examples. Describe the configuration of all such points. In particular, how does this configuration relate to the two given points?



3. The rectangle shown below has been broken into four smaller rectangles. The area of three of the smaller rectangles are shown in the diagram. Find the area of the fourth rectangle and justify your answer. [Think about shared dimensions.]

234	312
270	

4. On quad-ruled graph paper, draw a fairly large graph of the first quadrant only with your y-axis labeled “distance from home” and your x-axis labeled “time.” On it, graph a representation of what a trip from your home to school and back might look like if you did each of the following. Be sure to explain each leg of the journey. Be creative.

- a. Stopped for gas or Popeyes
- b. Forgot something and had to go back home to get it
- c. Had to go through another slow school zone and/or get on the highway.

5. The scatterplot below shows the size x and the sale price y of 25 houses for sale in Town H. Find an equation for a line of best fit for the data.



The following problems represent the essential skills you need to be successful in Algebra 2.

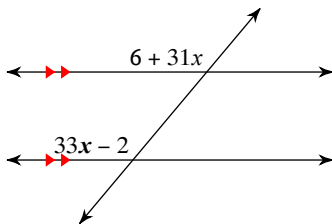
Simplify.

1) $10\sqrt{90}$

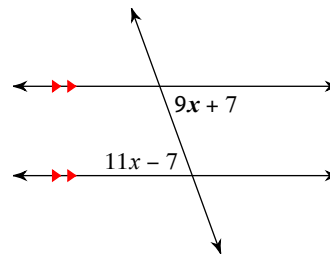
2) $2\sqrt{144}$

Find the measure of the angle indicated in bold.

3)



4)



Find the distance between each pair of points.

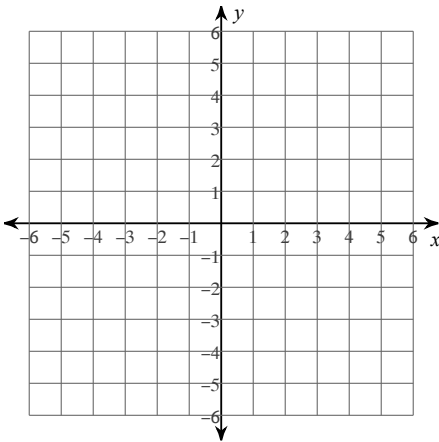
5) $(0, -8), (2, 2)$

Find the midpoint of the line segment with the given endpoints.

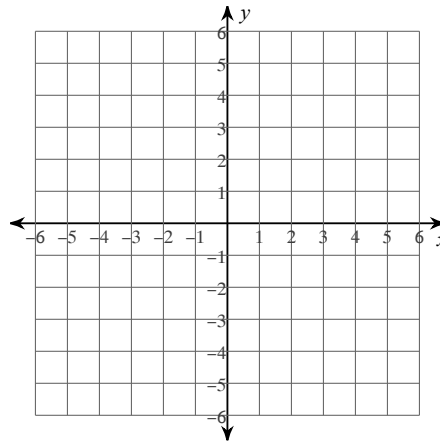
6) $(8, -1), (-10, -10)$

Sketch the graph of each line.

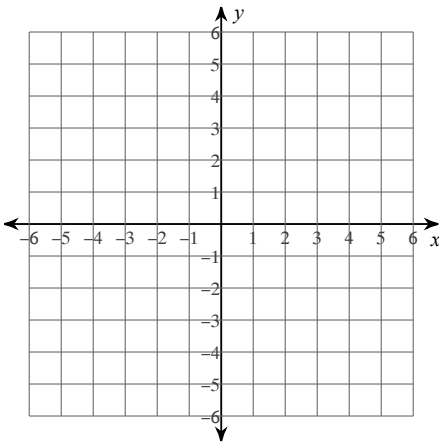
7) $y = 4$



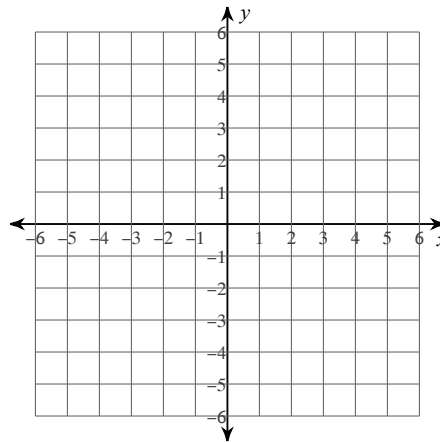
8) $20 - 7x = -4y$



9) $x = -5y$

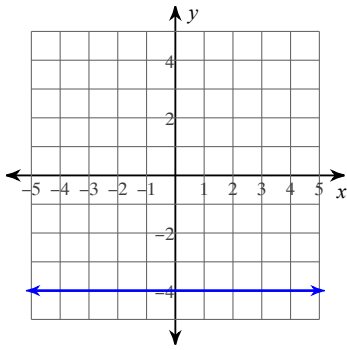


10) $-4 + 3x = -4y$

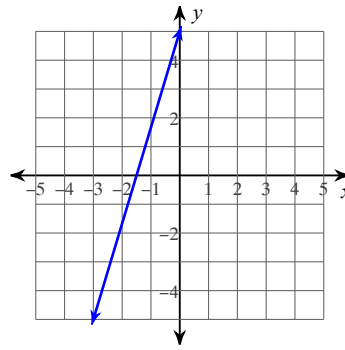


Write the slope-intercept form of the equation of each line.

11)



12)



Write the slope-intercept form of the equation of the line described.

13) through: $(1, -4)$, parallel to $y = x + 5$

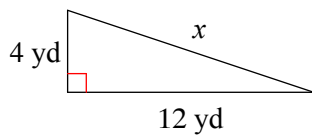
14) through: $(-5, 1)$, parallel to $y = 0$

15) through: $(-2, 0)$, perp. to $y = \frac{2}{5}x - 4$

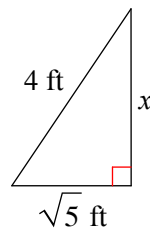
16) through: $(-1, 0)$, perp. to $y = -\frac{1}{5}x + 5$

Find the missing side of each triangle. Leave your answers in simplest radical form.

17)

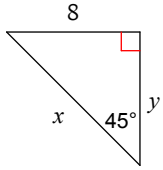


18)

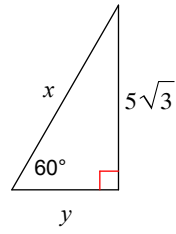


Find the missing side lengths. Leave your answers as radicals in simplest form.

19)

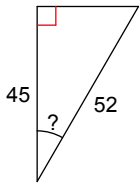


20)

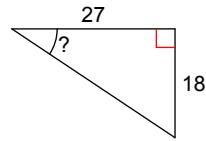


Find the measure of the indicated angle to the nearest degree.

21)

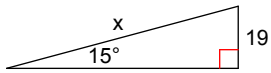


22)

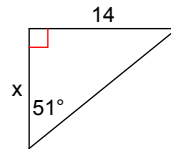


Find the missing side. Round to the nearest tenth.

23)

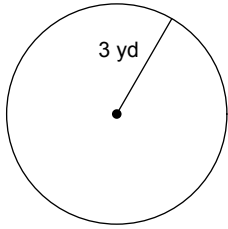


24)



Find the circumference of each circle. Use your calculator's value of π . Round your answer to the nearest tenth.

25)



26) area = 254.5 m²

Find the radius of each circle. Use your calculator's value of π . Round your answer to the nearest tenth.

27) area = 32.2 yd²

28) circumference = 62.8 in

Find the probability.

29) A box of chocolates contains eight milk chocolates and eight dark chocolates. You randomly pick a chocolate and eat it. Then you randomly pick another piece. Both pieces are milk chocolate.

30) There are seven nickels and eight dimes in your pocket. You randomly pick a coin out of your pocket and place it on a counter. Then you randomly pick another coin. The first coin is a nickel and the second coin is a dime.

31) A bag contains four yellow tickets numbered one to four. The bag also contains three green tickets numbered one to three. You randomly pick a ticket. It is yellow or has a number greater than two.

32) There are twelve shirts in your closet, four blue, three green, and five red. You randomly select one to wear. It is blue or green.