

DUE: August 9, 2021

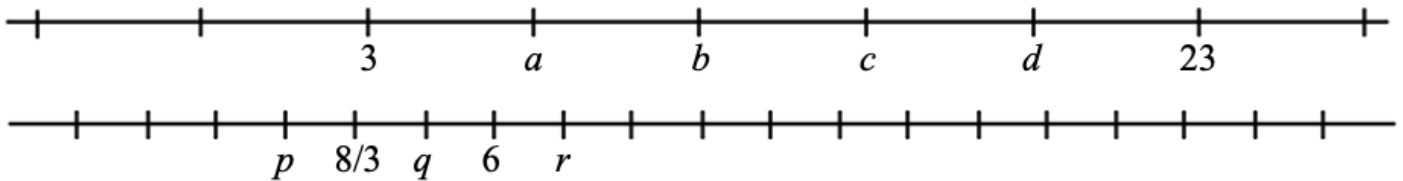
This assignment is for students who have completed Algebra I or Algebra I Honors and are taking Geometry Honors in the 2021-2022 school year.

Did you read the instructions? _____

What math are you taking in the 2021-2022 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. On each of the following number lines, all of the labeled points are evenly spaced. Find *coordinates* for the seven points designated by the letters:



2. Often it is necessary to rearrange an equation so that one variable is expressed in terms of others. For example, the equation $D = 3t$ expresses D in terms of t . To express t in terms of D , divide both sides of this equation by 3 to obtain $\frac{D}{3} = t$.

a) Solve the equation $C = 2\pi r$ for r in terms of C .

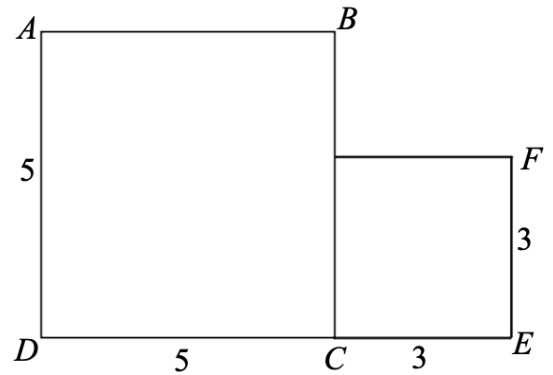
b) Solve the equation $p = 2w + 2h$ for w in terms of p and h .

c) Solve the equation $3x - 2y = 6$ for y in terms of x .

3. A team has started its season badly, winning 1 game, losing 6 and tying none. The team will plan a total of 25 games this season. Round all answers to the nearest percent.
- What percentage of the seven games played so far have been wins?
 - Starting with its current record of 1 win and 6 losses, what will the cumulative winning percentage be if the team wins the next 4 games in a row?
 - Starting with its current record of 1 win and 6 losses, how many games in a row must the team win in order for its cumulative winning percentage to reach at least 60%?
 - Suppose that the team wins ten of its remaining 18 games. What is its final winning percentage?
 - How many of the remaining 18 games does the team need to win so that its final winning percentage is at least 60%? Is it possible for the team to have a final winning percentage of 80%? Explain.
4. Each beat of your heart pumps approximately 0.06 liters of blood.
- If your heart beats 50 times, how much blood is pumped?
 - How many beats does it take for your heart to pump 0.48 liters?
 - Proportional relationships can be written in the form $y = kx$, and it is customary to say that y depends on x . Find an equation that shows how the volume pumped, V , depends on the number of beats, n .
 - Graph this equation, using appropriate scale, and calculate its slope. (You will have to do this on some graph paper and include the graph when you hand your work. Be sure to label your graph!)
 - What does the slope represent in this context?
 - Is this a continuous graph? Explain.

5. A 5 X 5 square and a 3 X 3 square can be cut into pieces that will fit together to form a third square.

a) Find the length of a side of the third square.



b) On a piece of graph paper (I recommend cm graph paper you can print from the internet), draw the above diagram of 2 squares. Mark point P on segment DC so that $PD = 3$. Using a ruler, draw segments PA and PF . Calculate the lengths of those segments.

c) Segments PA and PF divide the squares into pieces. Cut the pieces and arrange them to form the third square. Tape it to your work once you have figured out the puzzle.

Essential Skills

ID: 1

The following problems represent the essential skills you need to be successful in Geometry Honors.

Solve each equation.

1) $-33 + 8n = 1 + 6(1 + 3n)$

2) $-\frac{3}{2}x + 1 = -\frac{7}{2} + \frac{1}{2}x$

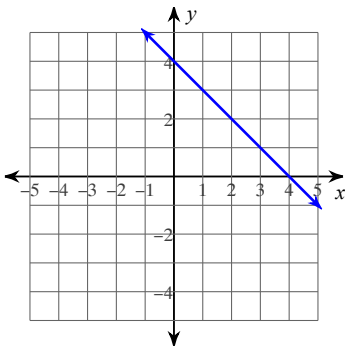
Solve each proportion.

3) $\frac{a}{7} = \frac{a + 1}{6}$

4) $\frac{k + 8}{5} = \frac{k - 4}{2}$

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

5)



Write the slope-intercept form of the equation of the line through the given points.

6) through: $(5, 0)$ and $(0, -1)$

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

7) through: $(-4, -4)$, parallel to $y = 2x + 1$

8) through: $(4, -2)$, perp. to $y = 2x - 5$

Solve each system by substitution.

9) $y = -7x + 22$
 $y = -5x + 14$

10) $-7x + 2y = -8$
 $y = x - 4$

Solve each system by elimination.

11) $7x + 5y = -22$
 $x - 5y = 14$

12) $7x + 5y = 6$
 $7x + 5y = 14$

Simplify. Your answer should contain only positive exponents.

13) $3x^2y^2 \cdot 4y^{-4}$

14) $(ab^0)^0 \cdot (2a^4b^{-4})^3 \cdot a^2b^3$

15) $\frac{2x^0y^2 \cdot 2y^3}{(2x^{-2})^2}$

Simplify each sum.

16) $(-6 - 6x - 5x^2) + (-x^3 + 7x + 4)$

Simplify each difference.

17) $(2n^2 - 3n + 6n^4) - (-7n^4 - 7n^2 + 7n)$

Find each product.

18) $(m + 2)(5m - 2)$

19) $(2n - 1)^2$

Factor the common factor out of each expression.

20) $7x + 28x^3$

21) $80c^3a - 32c^6 - 56ca^2b^3 + 72c^3b^3$

Factor each completely.

22) $56r^3 - 224r^2 + 32r - 128$

23) $7n^3 + 21n^2 - 8n - 24$

24) $p^2 + 4p - 12$

25) $5n^2 + 33n + 18$

Solve each equation by taking square roots.

26) $9k^2 + 10 = 775$

27) $2p^2 - 4 = 14$

Solve each equation by factoring.

28) $8a^2 + 8a - 4 = -4$

29) $3k^2 + 4k - 32 = 0$

Solve each equation with the quadratic formula.

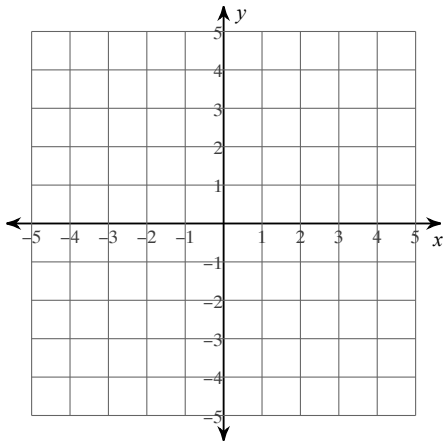
30) $4x^2 - 8x + 4 = 0$

31) $-5r^2 - 6r + 19 = 11$

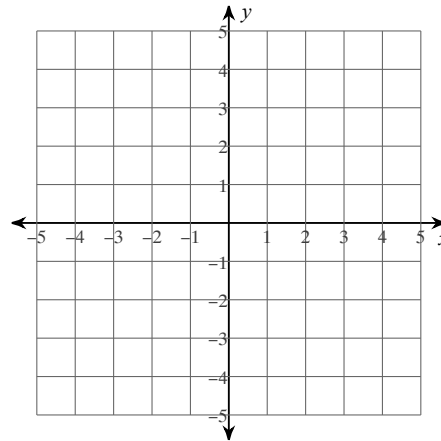
Solve each system by graphing.

32) $y = \frac{1}{2}x + 4$

$y = -\frac{7}{2}x - 4$



33) $8x + y = 4$
 $x + y = -3$



Simplify.

34) $\sqrt{100}$

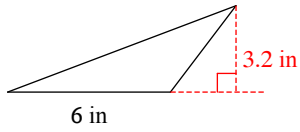
35) $\sqrt{45}$

36) $\sqrt{392x^2}$

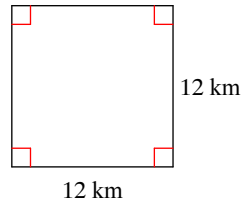
37) $\sqrt{448v^2}$

Find the area of each. Include a unit of measure.

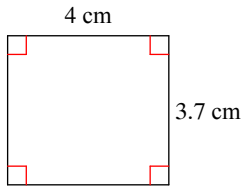
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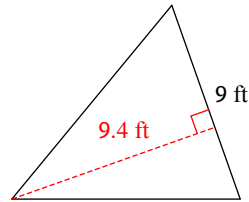
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40)

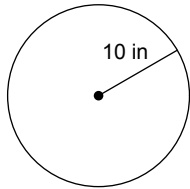


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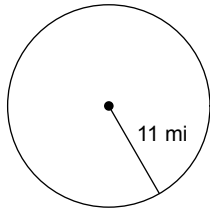
Find the circumference of the circle. Give your answer in terms of pi. Include a unit of measure.

42)



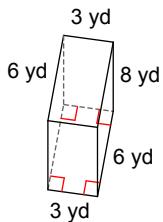
Find the area of the circle. Give your answer in terms of pi. Include a unit of measure.

43)



Find the volume of each figure. Round your answers to the nearest hundredth, if necessary. Give a unit of measure.

44)



45)

