

DUE: August 9, 2021

This assignment is for students who have completed Pre-Algebra and are taking Algebra 1 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. You have perhaps heard the saying, "A journey of 1000 miles begins with a single step." How many steps would you take to finish a journey of 1000 miles? What information do you need in order to answer this question? Find a reasonable answer. What would your answer be if the journey were 1000 kilometers?

2. Add the following fractions by finding a common denominator:

a. $\frac{27}{5} + \frac{3y}{4}$

b. $\frac{4m}{5} - \frac{2}{3}$

c. $2 + \frac{x}{3}$

d. $\frac{x}{2} + \frac{2x}{3} - \frac{3x}{4}$

3. Without resorting to decimals, find equivalences amongst the following nine expressions:

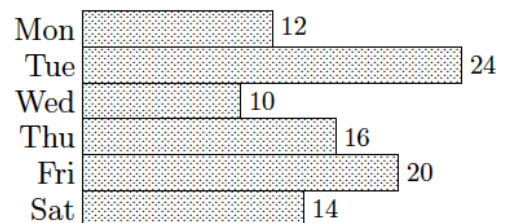
$$\frac{2 \cdot 3}{5} \quad \left(\frac{3}{5}\right) \cdot 2 \quad 3 \cdot \left(\frac{2}{5}\right) \quad \left(\frac{2}{5}\right)\left(\frac{3}{3}\right) \quad \left(\frac{5}{3}\right)^2 \quad 2 \div \frac{5}{3} \quad \frac{2}{5} \quad \frac{5}{3} \div \frac{1}{2} \quad \frac{3}{5/2}$$

4. Kelly telephoned Brook about a homework problem. Kelly said, "Four plus three times two is 14, isn't it?" Brook replied, "No, it's 10." Did someone make a mistake? Can you explain where these two answers came from?
5. A class sponsors a benefit concert and prices the tickets at \$8 each. Jordan sells 12 tickets, Andy 16, Morgan 17, and Pat 13. Compute the total revenue brought in by these four people in two different ways.
6. It is customary in algebra to omit multiplication symbols whenever possible. For example, $11x$ means the same thing as $11 \cdot x$. If the multiplication dot were simply removed, which of the following expressions would continue to have the same meaning?
- a. $4 \cdot \frac{1}{3}$ b. $1.08 \cdot p$ c. $24 \cdot 52$ d. $5 \cdot (2 + x)$
7. Woolworth's had a going-out-of-business sale. The price of a telephone before the sale was \$39.98. What was the price of the telephone after a 30% discount? If the sale price of the same telephone had been \$23.99, what would the (percentage) discount have been?

8. When describing the growth of a population, the passage of time is sometimes described in generations, a generation being about 30 years. One generation ago, you had two ancestors (your parents). Two generations ago, you had four ancestors (your grandparents). Ninety years ago, you had eight ancestors (your great-grandparents). How many ancestors did you have 300 years ago? 900 years ago? Do your answers make sense?

9. Before you are able to take a bite of your new chocolate bar, a friend comes along and takes $\frac{1}{4}$ of the bar. Then another friend comes along and you give this person $\frac{1}{3}$ of what you have left. Make a diagram that shows the part of the bar left for you to eat.

10. Jess and Taylor go into the cookie-making business. The chart shows how many dozens of cookies were sold (at \$3.50 per dozen) during the first six days of business.



a. What was their total income during those six days?

b. Which had more income, the first three days or the last three days?

c. What was the percentage decrease in sales from Tuesday to Wednesday? What was the percentage increase in sales from Wednesday to Thursday?

d. Thursday's sales were what percent of the total sales?

e. On average, how many dozens of cookies did Jess and Taylor sell each day?

11. A group of ten people were planning to contribute equal amounts of money to buy some pizza. After the pizza was ordered, one person left. Each of the other nine people had to pay 60 cents extra as a result. How much was the total bill?

Essential Skills

The following problems represent the essential skills you need to be successful in Algebra 1.

12. Solve for x:

a. $2(x-3)=4$

b. $-3(2x+1)=5$

d. $a(bx+c)=d$

13. Simplify each of the following:

a. the sum of $6x + 2$ and $-8x + 5$

b. the result of subtracting $5x - 17$ from $8x + 12$;

c. the product of $7x$ and $4x + 9$.

14. Simplify the expression $k - 2(k - (2 - k)) - 2$ as much as possible. Your final answer should not use parentheses.

15. Find the slope for the following ordered pairs:

a. $(-15, -8), (-16, -16)$

b. $(3, 6), (19, -16)$

c. $(12, 3), (7, 20)$

d. $(8, 17), (4, 17)$

e. $(-3, 7), (-3, -15)$

16. Solve each system by substitution:

a. $y = -2x$
 $-x - y = 3$

b. $y = 5$
 $-7x + 2y = 24$

c. $4x + 7y = 18$
 $y = 6$

d. $5x + 3y = 7$
 $y = 2x + 4$

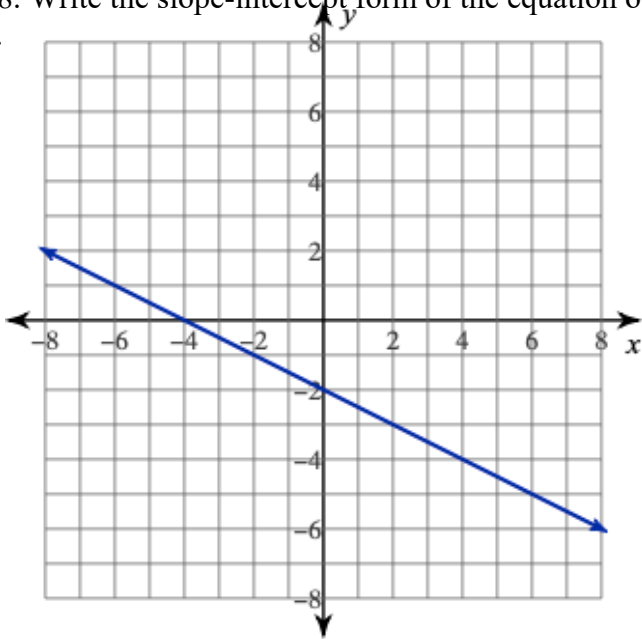
17. Write the slope-intercept form of the given equations with the slope and y- intercept given.

a. Slope = -5 y-intercept = 1

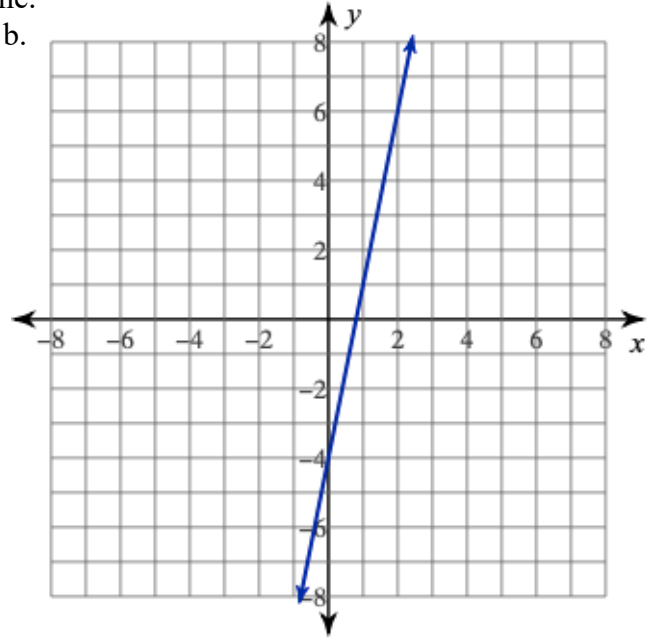
b. Slope = $-\frac{1}{2}$ y-intercept = -1

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

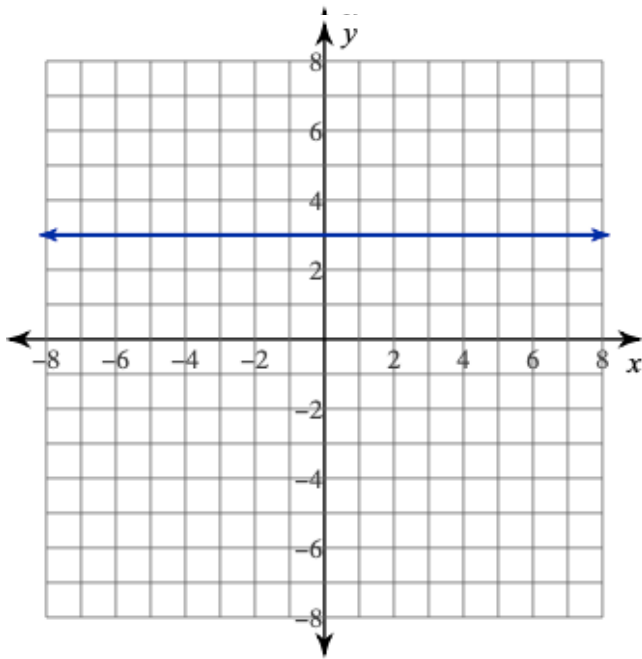
a.



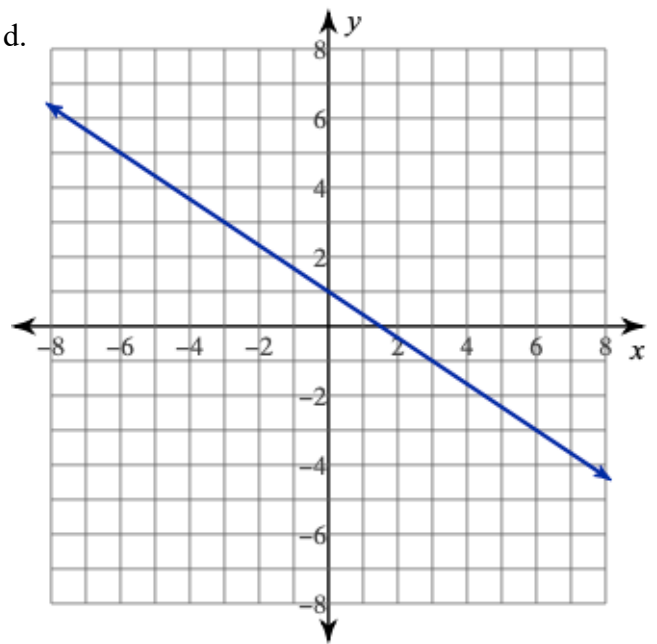
b.



c.



d.



19. Simplify each expression. Your answer should contain only positive exponents.

a. $(x^2y^7)(x^3y^5)$

b. $\frac{24x^7}{8x^3}$

c. $(2x^4y)^3$