

Algebra 1 Diagnostic Test

Name: _____

Last Course Completed: _____

School: _____

Directions: Complete all problems on this paper and show as much work as possible. If you don't know how to solve a problem, leave the problem blank. Calculators are not permitted unless the calculator icon is present.



When you finish the test, scan or take a picture of your test. Then send it to me at admin@algebra-class.com.

1. Evaluate each problem.

a. $12 + 18(-2) - 5(-6) \div 2 =$ _____ b. $10 - \frac{15}{5} - 2(-7) + 3^2 =$ _____

2. Simplify each problem.

a. $-3(x + 8)$

b. $-5(x - 4) - 3(2x + 1)$

3. The width of a rectangle is 10 inches and the length is 9 inches.

a. Find the perimeter of the rectangle. B. Find the area of the rectangle.

4. Solve the following equation for x .

$$3(x + 4) - 2(x - 3) = 13$$

5. Solve the following equation for y .

$$\frac{1}{2}(y + 4) + \frac{2}{3}y = 16$$

6. The following formula is used to find the surface area of a cone.



$$S = \pi r \ell + \pi r^2$$

Part A: Solve for ℓ .

Part B: Find ℓ when $S = 219.8$
and $r = 5$. Use 3.14 for π .

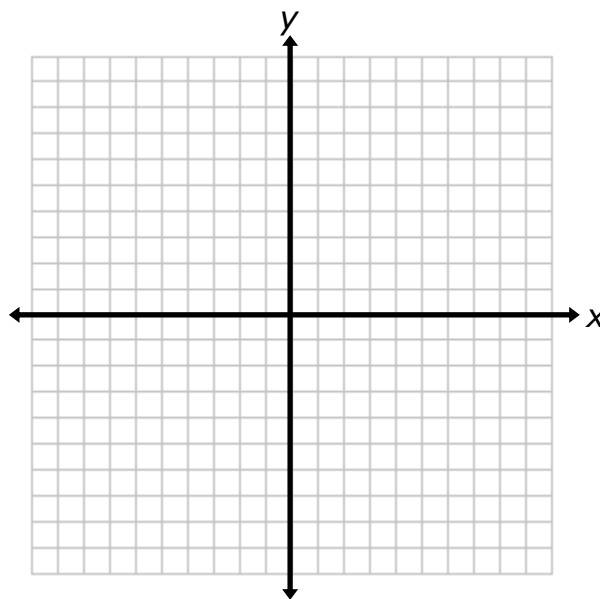
7. Solve the following equation for x .

$$-2(x + 5) + 1 = 3x - 4(x + 2) + 2$$

8. **Part A:** Graph the following system of equations on the grid. Label each equation.

line a : $2x - 2y = 10$

line b : $y = -4x + 10$



Part B: Identify the solution to the system of equations.

9. Write an equation for a line that passes through the points $(-3, 4)$ & $(1, -12)$

10. **Part A:** Lisa is trying to save money. In January, she had \$125 in her savings account and in July she had \$550 in her account. What is the rate of change between January and July?



Part B: What does the rate of change mean in this context?

11. Jonathan receives \$10 per week for doing chores around the house. He also mows lawns for his neighbors and earns \$15 per lawn. Write an equation that can be used to determine Jonathan's weekly earnings, y , based on the number of lawns mowed, x .

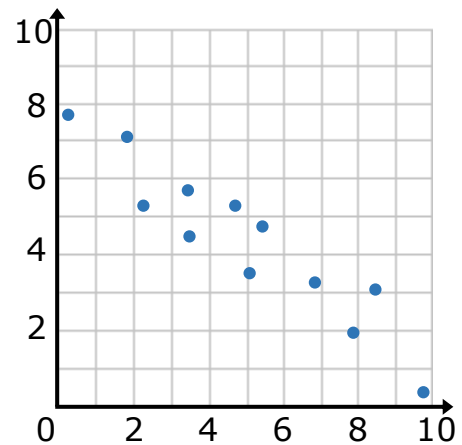
12. Lyla has \$150 to purchase shrubs for her front yard. Small shrubs cost \$20 per shrub and large shrubs cost \$35 per shrub.

Part A: Write an equation that can be used to determine the number of small shrubs, x , and the number of large shrubs, y that Lyla can purchase.

Part B: If Lyla purchases 2 large shrubs, what is the greatest amount of small shrubs that she can purchase? Show how you determined your answer.

13. Which answer choice best describes the line of best fit for the following scatter plot.

- A. The line of best fit would be a straight line through $(0,10)$ and $(10,0)$.
- B. The line of best fit would be a straight line through $(0,8)$ and $(10,0)$.
- C. The line of best fit would be a straight line through $(0,6)$ and $(8,0)$.
- D. There is no line of best fit.



14. Solve the following system of equations. Be sure to show your work!

$$\begin{aligned} x &= 2y - 4 \\ 3x + 5y &= 21 \end{aligned}$$

15. Solve the following system of equations. Be sure to show your work!

$$2x + 5y = -4$$

$$3x - 2y = -6$$

16. Solve the following inequality.

$$-3(2a - 6) < 12$$

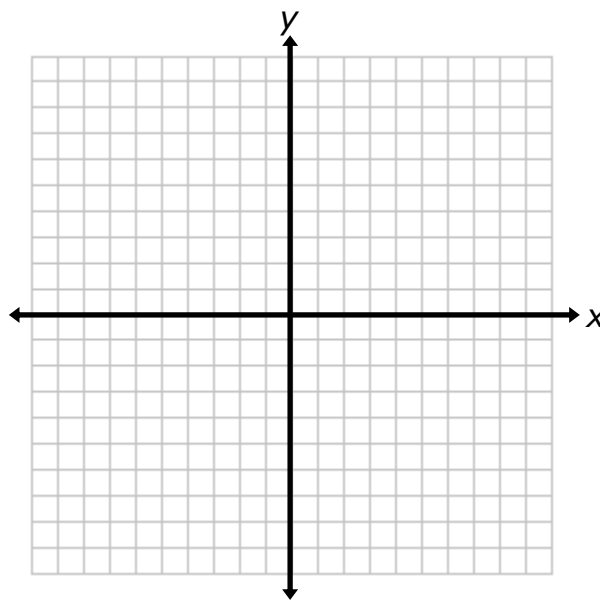
17. Vera has at most \$30 to buy gas and get a car wash. Gas costs \$2.30 per gallon and a car wash costs \$8.00. 

Part A: Write an inequality that can be used to determine the number of gallons of gas, x , Vera can purchase.

Part B: Solve the inequality to identify how many gallons of gas Vera can purchase.

18. **Part A:** Graph the following system of inequalities on the grid.

$$\begin{aligned}y &\geq -3x + 8 \\ 2x + 3y &< 12\end{aligned}$$



Part B: Identify two solutions.

19. Simplify. All exponents must be positive.

Part A: $4a^3(2a^5)$

Part B: $(2a^4)^3$

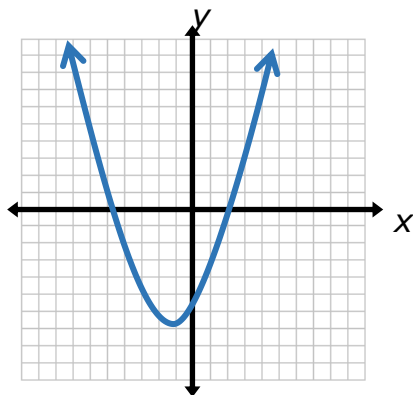
Part C: $\frac{3a^4b^5c^2}{4a^2b^2c}$

Part D: $2a^{-1}b^3c^{-4}$

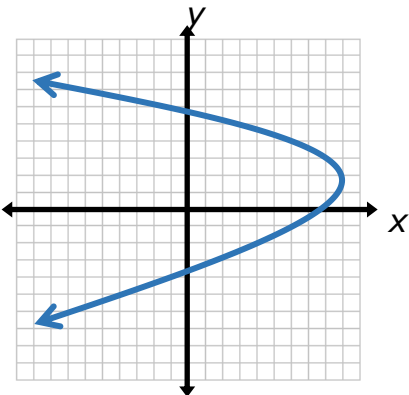
20. Three relations are shown.

Part A: Identify which relations are functions.

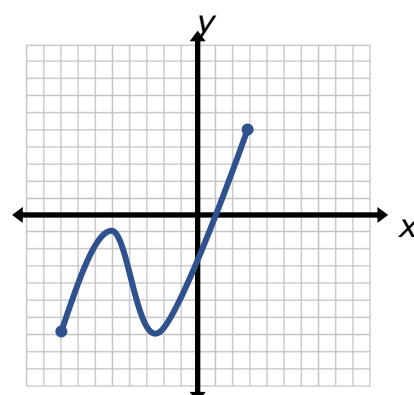
Part B: For the relations that are a function, identify the domain and range.



Function? Yes, No
Domain:
Range:



Function? Yes, No
Domain:
Range:



Function? Yes, No
Domain:
Range:

21. Determine whether the following function is linear or exponential. Explain your reasoning.

x	-2	-1	0	1	2	3
$f(x)$	3	9	27	81	243	729

22. A town has a population of 830 people. Its population is increasing by 2.5% each year.

Part A: Write an equation that can be used to determine the population in any given year.

Part B: What will be the approximate population of the town in 5 years?

23. Three functions are shown.

$$f(x) = -2x + 9$$

$$g(x) = 3^x$$

$$h(x) = 2x^2 + 3x - 4$$

Part A: Evaluate $g(4)$.

Part B: Evaluate $h(-1)$.

24. Simplify each expression.

Part A: $(5x^2 - 4x + 6) - (2x^2 + 3x - 2)$

Part B: $(3x + 5)(2x - 1)$

25. Factor each of the polynomials completely.

Part A: $x^2 + x - 56$

Part B: $6x^2 + 10x - 4$

26. A right triangle has a side with length 15 inches and a hypotenuse with length 25 inches. Find the length of the second leg. Round to the nearest hundredth if needed.



27. Find the zeros for the following function:

$$F(x) = x^2 - 9x - 36$$

28. A ball is shot from a canon into the air with an upward velocity of 45 ft/sec. The following function gives the height, h , of the ball at any time, t .

$$h(t) = -16t^2 + 45t + 1.5$$

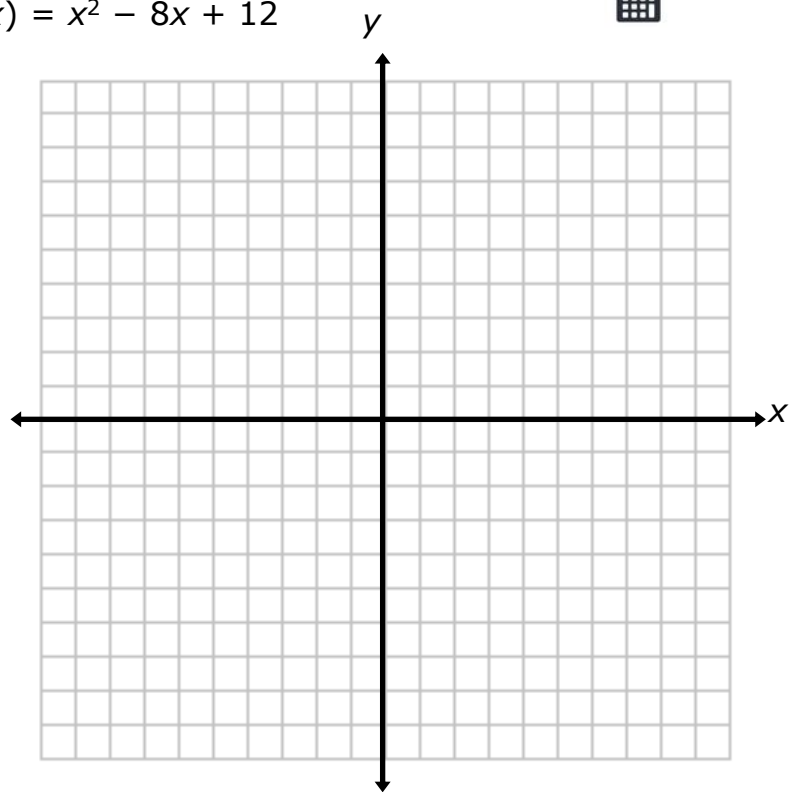


Part A: Find the maximum height obtained by the ball.

Part B: How long did it take for the ball to reach the ground?

29. Graph the following function on the grid. Explain how you graphed the function.

$$f(x) = x^2 - 8x + 12$$



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