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Algebra 1 End of Course Study Guide

Show all work for full credit!

1. Create and solve an equation that matches the following description: two times three less than a number is the same as four times that number.

2. Let $f(x)$ and $g(x)$ be functions defined as the following:

$$f(x) = x^2 - 7x + 1$$

$$g(x) = 3x - 9$$

What is $f(x) - g(x)$?

3. Solve and graph the following inequality:

$$-2x + 7 \geq 3$$

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4. Solve the following equation:

$$5x^2 - 13 = -2x^2 + 36$$

5. Pete's Dad wants to build a garden to grow their own fresh vegetables. The area that the garden covers is 132 square feet and the garden is in the shape of a rectangle. The length of one side of the rectangle is 11 feet. What is the perimeter of the garden?

6. The following table shows the quantities of four functions as the values for x gets larger:

x	$f(x)$	$g(x)$	$h(x)$	$g(x)$
0	1	0	0	8
1	2	1	4	10
2	4	4	8	12
3	8	9	12	14
4	16	16	16	16
...

Which function will have the largest output as values of x increase?

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7. What are the next three terms of the following sequence of numbers: 4, 16, 64...? State the explicit formula and find the 10th term of the sequence.

8. Justin boarded a plane that runs from Los Angeles to Chicago. The distance between the two cities is about 2000 miles and he his flight was about 4 hours and 30 minutes. How fast was Justin's plane traveling? Round your answer to the nearest hundredth's place.

9. Factor the following expression:

$$x^2 - 11x + 28$$

10. Let $f(x)$ and $g(x)$ be the following functions:

$$f(x) = x^2 + 3x - 6$$

$$g(x) = -2x + 7$$

a. Find $f(x) + g(x)$.

b. Evaluate $f(f(2))$.

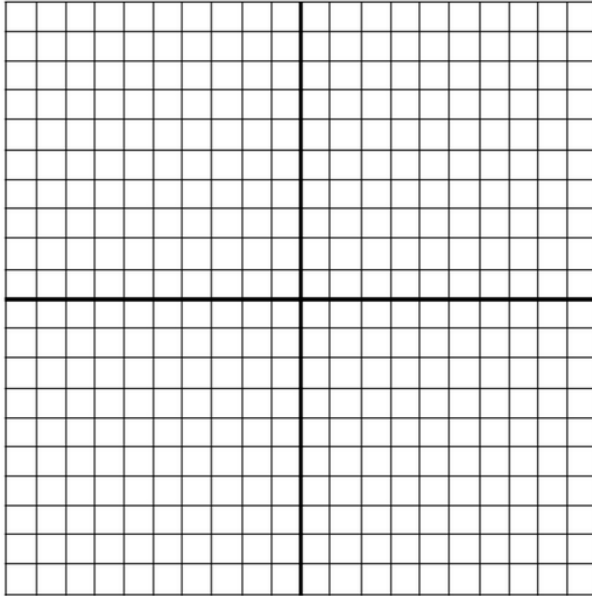
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11. Consider the following function:

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

a. Create a graph using a table of values.



x	f(x)

b. State the domain and range of the function.

c. What are the x-intercepts?

d. What is the y-intercept?

e. Where is the vertex located?

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12. Mike has been struggling with math for the past year, so in order to help him pass his class Mike hired a math tutor. The tutor charges \$17 an hour plus a one-time fee of \$30.

- a. Create an equation that models how much the tutor is charging Mike.

- b. How much would Mike be charged if he needed to be tutored for 12 hours one week?

- c. If Mike has a budget of \$220, how many hours can he afford with the tutor?

13. $f(x)$ and $g(x)$ are defined as the following functions

$$f(x) = 2x^2 + 3x - 12$$
$$g(x) = -3x + 5$$

Find $f(x) - g(x)$.

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14. Marcus and Jude are starting new jobs at the same time. Marcus gets paid \$8.50 an hour plus an additional flat rate \$50 to accommodate for traveling expenses. Jude gets paid \$11.00 an hour but will get deducted \$36 to pay for her uniform. How many hours must Jude work to make the same amount as Marcus for their first paycheck?
15. Joyce is setting up a bake sale to raise money for her drama club at school. She plans to sell baked goods for \$1.50 per item. She had also spent \$36 on baking ingredients and other supplies. How many baked good must Joyce sell in order to make a profit?
16. Solve and graph the following compound inequality:

$$1 \leq -x + 4 \text{ AND } -1 > -x - 5$$

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17. John, James, Jill, and Jackie are all participating in a charity walk to raise money for a local zoo. For every mile walked the zoo receives \$1.75 in donations. The table below is a record for how many days each person participated in the walk and how many miles they walked in that time.

	Miles Walked	Days Participated
John	112	30
James	48	12
Jill	36	18
Jackie	81	27

- Who walked the most miles in total?
 - Who walked the most miles per day?
 - How much money did all four participants raise together for the zoo?
18. Solve the following equation for x :

$$3(x + 7) = 12x - 3(2x + 2)$$

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19. Solve the following equation for the variable u :

$$x + k = uv - ut$$

20. Solve the following equation for y

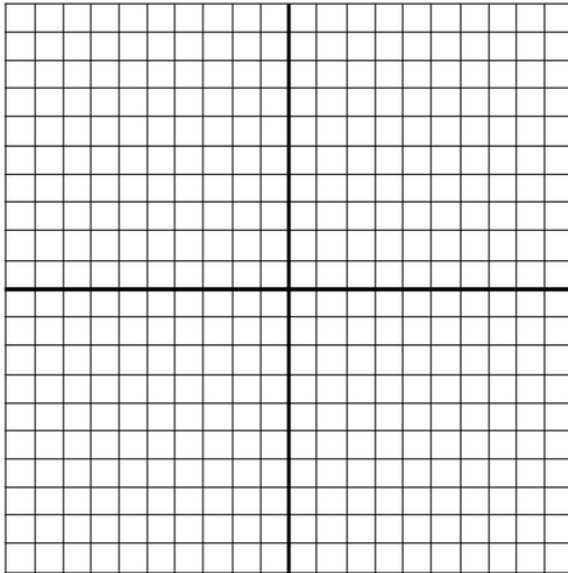
$$xy - x = x^2$$

21. Let $f(x)$ and $g(x)$ be functions that are defined.

$$f(x) = x^2 - 4x - 2$$

$$g(x) = -3x^2 - 6x + 6$$

a. Graph the functions $f(x)$ and $g(x)$.



b. Explain in words the transformation that occurs between the graphs from $f(x)$ to $g(x)$.

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22. Solve by using the quadratic formula: $f(x) = 3x^2 + 6x - 21$

23. Identify the next 4 terms and construct the explicit formula of the following arithmetic sequence: 5, 8, 11, 14...

24. Solve the following quadratic by completing the square: $f(x) = x^2 + 6x - 16$

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25. Consider the following set of data:

11 12 12 15 16 8 20 13 15 17 16 9 20 19

a. Construct a box plot of the given data set.

b. Construct a dot plot of the given data set.

26. In a landscape plan, a rectangular flowerbed is designed to be 4 meters longer than it is wide. If 60 square meters are needed for the plants in the bed, what should the dimensions of the rectangular bed be?

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27. Solve the following system of linear equations:

$$-x - 3y = 11$$

$$4x - y = 8$$

28. Solve the following linear equation: $\frac{2}{3}x - 6 = 4$

29. Graph the following system of linear inequalities:

$$y > 2x - 3$$

$$y \geq \frac{1}{2}x + 2$$

