

First and Last Name _____

Teacher _____ **Block** _____

This test will help us learn how you think about algebra.
Please do your best to circle an answer for all the questions.

If you don't know an answer, you may guess or write "I don't know".
Please don't leave any questions blank – we want to know how much
you had time to try.

If you make a mistake, please lightly cross out the work, but do not
erase it. You may NOT use a calculator.

Only work forwards in the test booklet. Do not go back to a page that
you've already looked at, even if you have extra time. You have 45
minutes to answer all the questions.

Thank you for doing your best work!

This page is blank on purpose!

What is today's date? _____

1) If $10x + 12 = 17$, which of the following must also be true?

- a. $10x + 12 - 12 = 17 - 17$
- b. $10x - 10 + 12 - 10 = 17$
- c. $-10x - 12 = 17$
- d. $10x + 12 - 10 = 17 - 10$

2) Look at this pair of equations. **Without solving the equations**, decide if these equations are equivalent (have the same answer).

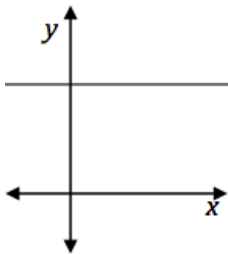
$$34 = 8(x + 1) + 6(x + 1)$$

$$34 = 14(x + 1)$$

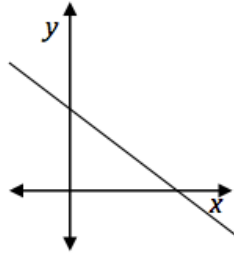
- a. YES
(same answer)
- b. NO
(different answer)
- c. CAN'T TELL
without doing the math
- d. CAN'T TELL
because I need more information

3) Sam drew the line $y = 6$. Andrea drew the line $x = 15$. Which of the following graphs correctly shows the line Sam or Andrea drew?

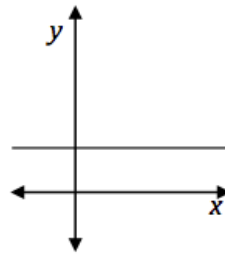
a. Andrea's graph



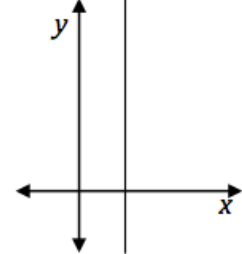
b. Andrea's graph



c. Sam's graph



d. Sam's graph



4) Circle the example that could represent a linear function.

a.

x	-3	0	3
y	4	6	8

b. $\frac{5}{x} + y = -7$

c.

x	1	3	5	3
y	4	2	0	-2

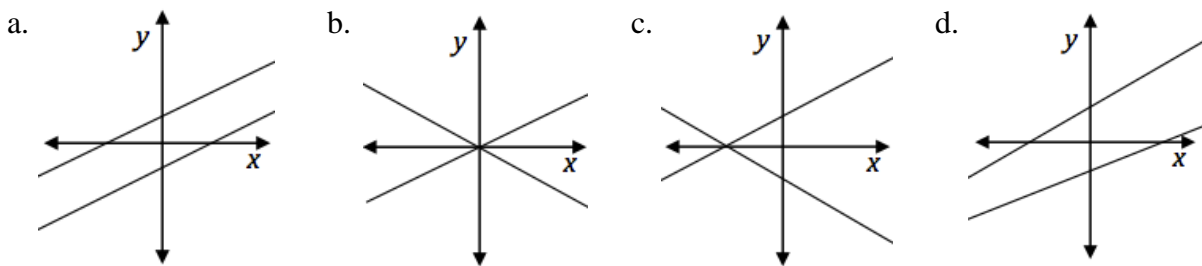
d. $x + \frac{2}{y} = 4$

5) Given the system of equations $\begin{cases} y = x + 1 \\ 2y = 3x + 4 \end{cases}$, why can we add $2y$ to one side of the equation

$y = x + 1$ and $3x + 4$ to the other side?

- Because you can combine like terms.
- Because you can add anything to both sides of an equation to make a new equation.
- Because the equation $2y = 3x + 4$ tells me that $2y$ has the same value as $3x + 4$.
- Because the equation $y = x + 1$ tells me that y has the same value as $x + 1$.

6) Which of the following graphs could represent a system of equations with no solution?



7) Which of the following expressions is NOT equivalent to $(x + 4)(3x + 2)$?

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

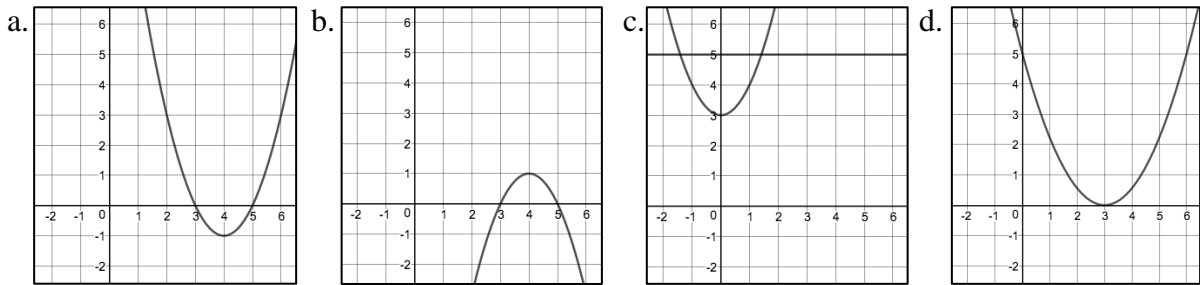
8) If $m \cdot k \cdot n = 0$ and $k = 7$, which of the following is true in all cases?

- $m = 0$ and $n = 0$
- $m \cdot k = 0$
- $m \cdot n = 0$
- both a and c

9) Which of the following is a like term to (could be combined with) $7(j + 4)$?

- $7(j + 10)$
- $7(p + 4)$
- $2(j + 4)$
- both a and c
- All of the above

10) Which of the following graphs shows a quadratic equation with solutions at $x = 3$ and $x = 5$?



- e. Both a and b
- f. Both a and d

11) Solve the equation below for x . Circle the letter for your answer.

$$8x + 3 = 3y - x$$

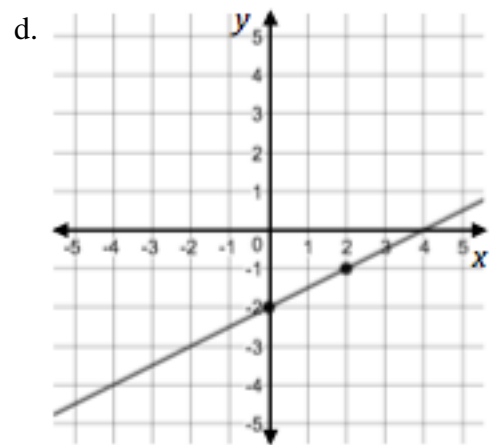
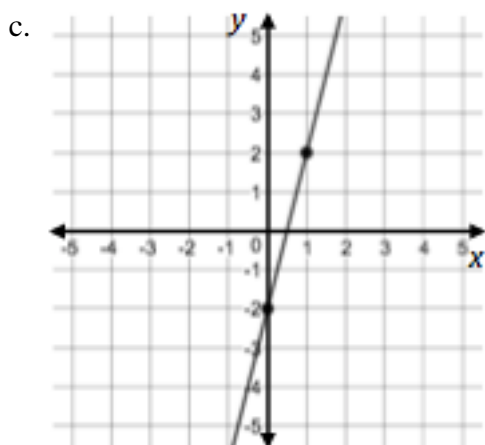
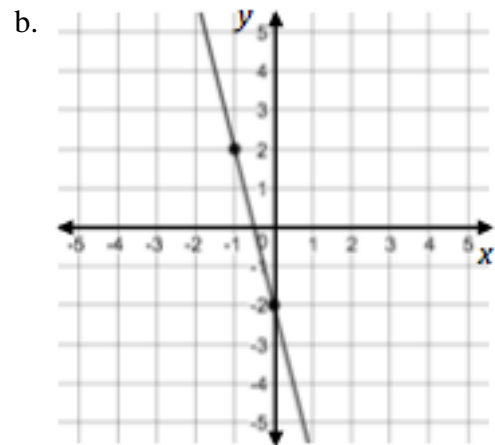
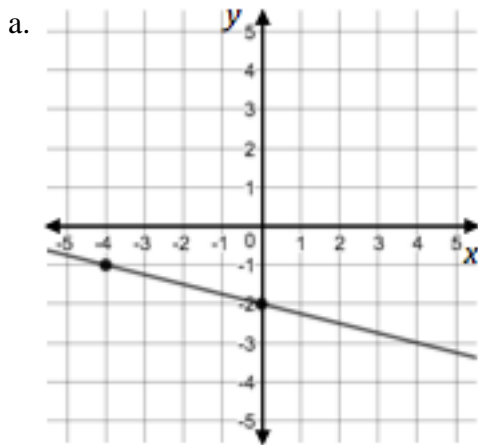
- a. $x = \frac{3}{7}y - \frac{3}{7}$
- b. $x = \frac{3}{7} - \frac{3}{7}y$
- c. $x = \frac{1}{3} - \frac{1}{3}y$
- d. $x = \frac{1}{3}y - \frac{1}{3}$

12) Solve the equation below for y . *Show all of your work.*

$$5(y - 2) = -3(y - 2) + 4$$

ANSWER: _____

13) Which of the following is the graph of the equation $y = 4x - 2$?



14) The points shown in the table lie on a line. What is the slope of the line?

x	1	3	7	-1
y	-1	2	8	-4

a. $\frac{-2}{3}$

b. $\frac{2}{3}$

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

d. $\frac{8}{7}$

15) If $x + y = 12$ and $2x + 5y = 36$, what are the values of x and y ?

- a. (9, 3)
- b. (4, 8)
- c. (2, 10)
- d. (8, 4)

16) Sarah is solving the system of equations $\begin{cases} 5x + 6y = 10 \\ x + 2y = 7 \end{cases}$ using elimination. As a first step, how could she rewrite the second equation so that she can use the elimination method?

- a. $-5x - 6y = -35$
- b. $-5x - 10y = 7$
- c. $-5x - 10y = -35$
- d. $x - 6y = -21$

17) Circle the solutions to $x^2 - 7x + 6 = -6$.

- a. $x = 7$ or $x = -12$
- b. $x = 4$ or $x = 3$
- c. $x = -3$ or $x = -4$
- d. $x = 0$ or $x = -5$

18) Factor the expression completely. Circle your answer.

$$8x^2 + 18x + 9$$

- a. $2x(4x + 9) + 9$
- b. $8x^2 + 9(2x + 1)$
- c. $(8x + 9)(x + 1)$
- d. $(4x + 3)(2x + 3)$

19) What are the solutions to $3x^2 - 6x - 24 = 0$?

- a. $x = -3$ or $x = 12$
- b. $x = 3$ or $x = -8$
- c. $x = 4$ or $x = -6$
- d. $x = 4$ or $x = -2$

20) Simplify the expressions below. *Show all of your work.*

$$\sqrt{\frac{15}{20}}$$

ANSWER: _____

21) Below is the beginning of Gabriella's, Jamal's, and Nadia's work in solving the equation $x + 7 - 3 = 12 - 2x$. To start solving this problem, which way(s) may be used?

- a. Gabriella's way
- b. Jamal's way
- c. Nadia's way
- d. Jamal's and Nadia's ways
- e. Gabriella's, Jamal's, and Nadia's ways

Gabriella's way: Subtract 3 from 7: $x + 4 = 12 - 2x$	Jamal's way: Add $2x$ to both sides: $3x + 7 - 3 = 12$	Nadia's way: Subtract $(7 - 3)$ from both sides: $x = 8 - 2x$
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22) Below is the beginning of Gabriella's, Jamal's, and Nadia's work in simplifying the expression $(7x^3 + 4x) - (8x^2 + 5x - 3)$. To start solving this problem, which way(s) may be used?

- a. Gabriella's way
- b. Jamal's way
- c. Nadia's way
- d. Gabriella's and Jamal's ways
- e. Gabriella's and Nadia's ways

Gabriella's way:	Jamal's way:	Nadia's way:
$7x^3 - 8x^2 + 4x - 5x + 3$ $7x^3 - 8x^2 + (4 - 5)x + 3$	$7x^3 + 4x$ $\underline{-8x^2 - 5x + 3}$ $(7 - 8)x^{3+2} + (4 - 5)x + 3$	$7x^3 + 0x^2 + 4x + 0$ $\underline{-0x^3 - 8x^2 - 5x + 3}$ $(7 - 0)x^3 + (0 - 8)x^2 + (4 - 5)x + 3$

23) Gabriella solved the following problem:

$$\begin{cases} x + 2y = 9 \\ 3x - 2y = 11 \end{cases}$$

This is how Gabriella started the problem:

$$x + 2y = 9$$

$$2y = 9 - x$$

$$y = \frac{9 - x}{2}$$

23a. Which of the following describes Gabriella's approach?

- a. Add the first equation and the second equation together.
- b. Solve the first equation for x .
- c. Multiply both sides of the first equation by 3.
- d. Solve the first equation for y .

23b. Do you think this is a good way to start this problem? **Circle one:**

- a. Very good way
- b. May be used, but not a very good way
- c. May not be used

24) Jamal graphed the line given by the following equation:

$$2x + 3y = 12$$

This is how Jamal started the problem:

$$\begin{array}{ll} 2x + 3y = 12 & 2x + 3y = 12 \\ 2x + 3(0) = 12 & 2(0) + 3y = 12 \end{array}$$

24a. Which of the following describes Jamal's approach?

- a. Convert the equation to $y = mx + b$ form.
- b. Find the slope.
- c. Solve for y .
- d. Find the x - and y -intercepts.

24b. For which of the following equations would Jamal's approach be the BEST way?

Circle one:

- a. $3x + 5y = -22$
- b. $5x + 3y = 16$
- c. $5x + 3y = -30$
- d. $3x + 5y = 17$

For questions 25-28, **imagine you are taking a timed test.** You want to use fast (and correct) ways to solve the problems so you can finish as many as possible. Choose the best way to approach each problem.

25) On a timed test, which would be the BEST way to solve the equation below? (Circle the letter for the best way.)

$$8(n+1) = 2(n+1) + 12$$

a. Gabriella's way: $8n + 8 = 2n + 2 + 12$	b. Jamal's way: $4(n+1) = (n+1) + 6$	c. Nadia's way: $6(n+1) = 12$
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- 26) On a timed test, which would be the BEST way to start solving this system of equations?
(Circle the letter for the best way.)

$$\begin{cases} 4x - 3y = 11 \\ 5x + y = 19 \end{cases}$$

<p>a. Gabriella's way:</p> $5x + y = 19$ $y = 19 - 5x$ <p>...</p>	<p>b. Jamal's way:</p> $5 \cdot (4x - 3y = 11)$ $-4 \cdot (5x + y = 19)$ <hr style="width: 100%;"/> <p>...</p>	<p>c. Nadia's way:</p> $4x - 3y = 11$ $x = \frac{3y + 11}{4}$ <p>...</p>
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- 27) On a timed test, which would be the BEST way to start factoring the trinomial below?
(Circle the letter for the best way.)

$$12x^2 + 24x - 36$$

<p>a. Gabriella's way:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Factors of 12</th> <th style="text-align: center;">Factors of -36</th> <th style="text-align: center;">Factorization</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2, 6</td> <td style="text-align: center;">2, -18</td> <td style="text-align: center;">$(2x + 2)(6x - 18)$</td> </tr> <tr> <td style="text-align: center;">2, 6</td> <td style="text-align: center;">18, -2</td> <td style="text-align: center;">$(2x + 18)(6x - 2)$</td> </tr> <tr> <td style="text-align: center;">6, 2</td> <td style="text-align: center;">2, -18</td> <td style="text-align: center;">$(6x + 2)(2x - 18)$</td> </tr> <tr> <td style="text-align: center;">...</td> <td></td> <td></td> </tr> </tbody> </table>	Factors of 12	Factors of -36	Factorization	2, 6	2, -18	$(2x + 2)(6x - 18)$	2, 6	18, -2	$(2x + 18)(6x - 2)$	6, 2	2, -18	$(6x + 2)(2x - 18)$...			<p>b. Jamal's way:</p> $12x^2 + 24x - 36$ $12(x^2 + 2x - 3)$	<p>c. Nadia's way:</p> $12x^2 + 24x - 36$ $2(6x^2 + 12x - 18)$
Factors of 12	Factors of -36	Factorization															
2, 6	2, -18	$(2x + 2)(6x - 18)$															
2, 6	18, -2	$(2x + 18)(6x - 2)$															
6, 2	2, -18	$(6x + 2)(2x - 18)$															
...																	

- 28) On a timed test, which would be the BEST way to start solving the equation below? (Circle the letter for the best way.)

$$(7x + 5)^2 = 64$$

<p>a. Gabriella's way:</p> $(7x + 5)(7x + 5) = 64$	<p>b. Jamal's way:</p> $(7x)^2 + 2(7x)(5) + 5^2 = 64$	<p>c. Nadia's way:</p> $\sqrt{(7x + 5)^2} = \sqrt{64}$
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