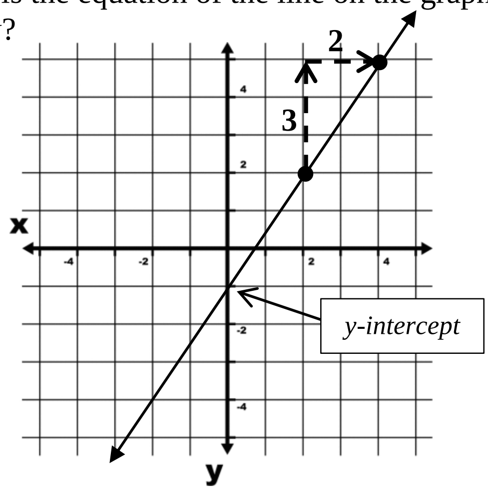
1 What is the equation of the line on the graph below?



Solution: To write an equation in slope-intercept form, identify the slope and *y*-intercept and substitute these values into the equation. The slope-intercept form of a linear equation is:

$$y = mx + b.$$

To identify the slope from a graph, locate two points and use the $\frac{rise}{run}$ ratio or subtract with the slope formula.

$$m = \frac{rise}{run} = \frac{3}{2}$$

OR

$m = \frac{y_2 - y_1}{x_2 - x_1}$ Write the slope formula

$m = \frac{5-2}{4-2}$ Substitute the coordinates of two points

$m = \frac{3}{2}$ Simplify

The *y*-intercept is the *y*-coordinate of the point on the line that crosses the *y*-axis, which is at –1. Substitute the values of the slope and *y*-intercept into the equation.

$y = mx + b$ Write slope - intercept form

$y = \frac{3}{2}x - 1$ Substitute $\frac{3}{2}$ for m and -1 for b

For Standard Form ($Ax + By = C$):

$y = \frac{3}{2}x - 1$ Write slope - intercept form

$-\frac{3}{2}x + y = \left(\frac{3}{2}x - \frac{3}{2}x\right) - 1$ Inverse operations : zero pairs

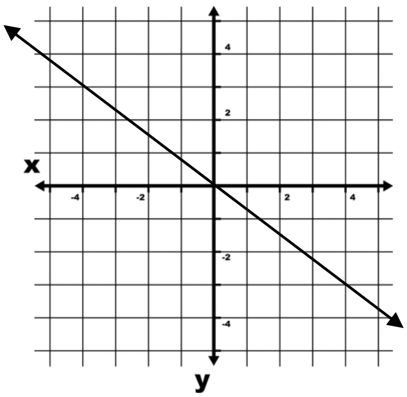
$-\frac{3}{2}x + y = -1$ Simplify

$-2\left(-\frac{3}{2}x + y\right) = -2(-1)$ Multiply with LCD to clear fractions

$3x - 2y = 2$ Simplify

A-REI.10

1a´ You try:
What is the equation of the line on the graph below?



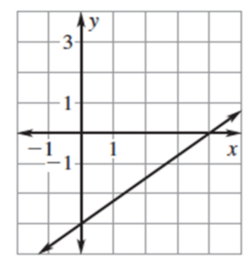
1b´ You try:
Match the equation with its graph.

1) $3x + 4y = 12$ ______

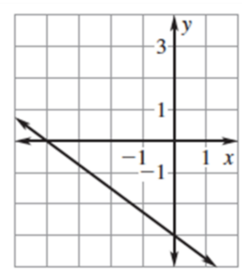
2) $3x + 4y = -12$ _____

3) $3x - 4y = 12$ ______

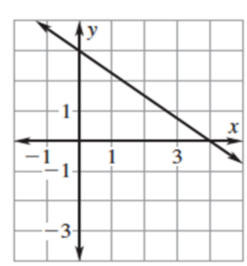
A.



B.



C.



2a Given the linear function $3x - 4y = 6$

Find the x- and y-intercepts

The x-intercept is the point where the graph of the line crosses the x-axis (or where y is zero). To find this from the equation, substitute 0 for y and solve for x.

$$3x - 4y = 6$$
$$3x - 4(0) = 6$$
$$3x = 6$$
$$x = 2$$
$$(2,0)$$

The y-intercept is the point where the graph of the line crosses the y-axis (or where x is zero). To find this from the equation, substitute 0 for x and solve for y.

$$3(0) - 4y = 6$$
$$-4y = 6$$
$$y = -\frac{3}{2}$$
$$\left(0, -\frac{3}{2}\right)$$

Find the rate of change

One method to find the rate of change/slope is to put the equation in slope-intercept form.

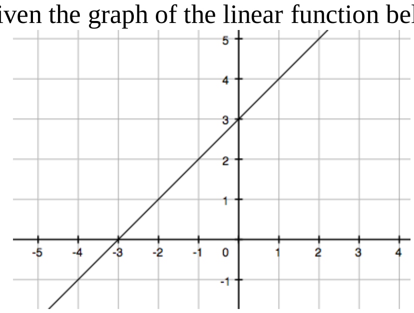
$$3x - 4y = 6$$
$$3x - 3x - 4y = -3x + 6 \quad \text{Inverse operations : zero pairs}$$
$$-4y = -3x + 6 \quad \text{Simplify}$$
$$\frac{-4y}{-4} = \frac{-3x}{-4} + \frac{6}{-4} \quad \text{Inverse operations : make ones}$$
$$y = \frac{3}{4}x - \frac{3}{2} \quad \text{Simplify}$$

From this, we can tell that the rate of change is $\frac{3}{4}$.

Because this rate is positive, the graph is increasing everywhere.

F-IF.9

2b Given the graph of the linear function below



Find the x- and y-intercepts

The x-intercept is (–3, 0) and the y-intercept is (0, 3).

Find the rate of change

One method to find the rate of change/slope is to use the slope formula with the x- and y-intercepts.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{3 - 0}{0 - (-3)} \quad \text{Substitute the points}$$
$$= \frac{3}{3} \quad \text{Simplify}$$
$$= 1 \quad \text{Simplify}$$

From this, we can tell that the rate of change is 1. Because this rate is positive, the graph is increasing everywhere.

F-IF.9

2a´ You try:

Find the x- and y-intercepts and the rate of change of

$$2x + y = -5$$

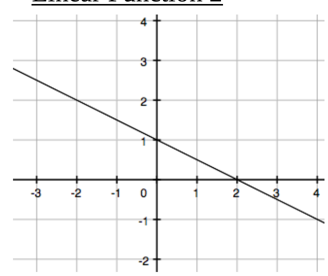
2b´ You try:

Given the equation of a linear function and the graph of a linear function below, select *all* of the following statements that are true.

Linear Function 1

$$y = -3x + 1$$

Linear Function 2



Mark all correct answers.

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

A) These functions have the same x-intercept.

B) These functions have the same y-intercept.

C) Both functions are increasing on all intervals.

D) The rate of change for Function 1 is less than the rate of change for Function 2.

E) The solution to the system containing both equations is (0, 1).

3 Determine the slope/rate of change for each of the following.

a) The equation $y = 5$

This equation is in slope-intercept form ($y = mx + b$), but there is no x-term.
Therefore, $y = 5$ can be rewritten as $y = 0x + 5$.

From this we can determine that the slope is zero.

b) The equation $3x – 2y = 8$

This equation is in standard form.
To find the rate of change, we can rewrite it in slope-intercept form.

$$3x - 2y = 8$$
$$3x - 3x - 2y = -3x + 8 \qquad \text{Inverse operations : zero pairs}$$
$$-2y = -3x + 8 \qquad \text{Simplify}$$
$$\frac{-2y}{-2} = \frac{-3x}{-2} + \frac{8}{-2} \qquad \text{Inverse operations}$$
$$y = \frac{3}{2}x - 4 \qquad \text{Simplify}$$

From this we can determine that the slope is $\frac{3}{2}$.

c) The points (9, 3) and (9, –2)

To find the rate of change, we can use the slope formula.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{3-(-2)}{9-9} \qquad \text{Substitute the points}$$
$$= \frac{5}{0} \qquad \text{Simplify}$$

Therefore, the slope is undefined.

F-IF.6

3a´ You try:
Determine the rate of change for

1) The equation $2x – y = 4$

2) The table

x	y
3	5
5	5
7	5

3b´ You try:
Select *all* of the following that have the same slope or rate of change as the linear function $y = 2x – 1$.

Mark all correct answers.
Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

A) (6, 2), (–1, 9)

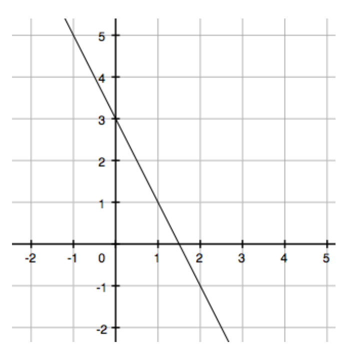
B) $4x – 2y = 8$

C) $y = –1$

D)

x	y
–4	6
–2	10
0	14

E)



4 Write an equation of the line that passes through the point $(6, -3)$ with a slope of $\frac{1}{2}$, in slope-intercept form, point-slope form, AND standard form.

Solution: To write an equation in slope-intercept form, identify the slope and y-intercept and substitute these values into the equation. The slope-intercept form of a linear equation is:

$$y = mx + b$$

We are given the slope, but need to find the y-intercept. Substitute the slope m and the coordinates of the point (x, y) in $y = mx + b$. Then solve for b.

$y = mx + b$	Write slope-intercept form
$-3 = \frac{1}{2}(6) + b$	Substitute $\frac{1}{2}$ for m, 6 for x, and -3 for y
$-3 = 3 + b$	Simplify
$-3 - 3 = (3 - 3) + b$	Inverse operations: zero pairs
$-6 = b$	Solve for b
$y = \frac{1}{2}x - 6$	Substitute $\frac{1}{2}$ for m and -6 for b

Solution: To write an equation in point-slope form, identify the slope and a point and substitute the values into the equation. The point-slope form of a linear equation is:

$y - y_1 = m(x - x_1)$ where (x_1, y_1) are the coordinates of one point.

$y - y_1 = m(x - x_1)$	Write point-slope form
$y - (-3) = \frac{1}{2}(x - 6)$	Substitute -3 for y_1, $\frac{1}{2}$ for m, and 6 for x_1
$y + 3 = \frac{1}{2}(x - 6)$	Simplify

Solution: To write an equation in standard form, collect the variable terms on one side and the constants on the other. The standard form of a linear equation is:

Ax* + *By* = *C, where A, B, & C are real numbers and A and B are not both zero, and A is usually positive.

$y = \frac{1}{2}x - 6$	Write slope-intercept form
$-\frac{1}{2}x + y = \left(\frac{1}{2}x - \frac{1}{2}x\right) - 6$	Inverse operations: zero pairs
$-\frac{1}{2}x + y = -6$	Simplify
$-2\left(-\frac{1}{2}x + y\right) = -2(-6)$	Distribute with LCD to clear fractions
$x - 2y = 12$	Simplify

A-CED.2

4a´ You try:
Write an equation of the line that passes through the point (–8, 3) with a slope of $\frac{3}{4}$, in slope-intercept form, point-slope form, AND standard form.

4b´ You try:
Select *all* of the following equations of a line that have a slope of –5 and pass through the point (–3, 7).

Mark all correct answers.
Ⓐ Ⓑ Ⓒ Ⓓ

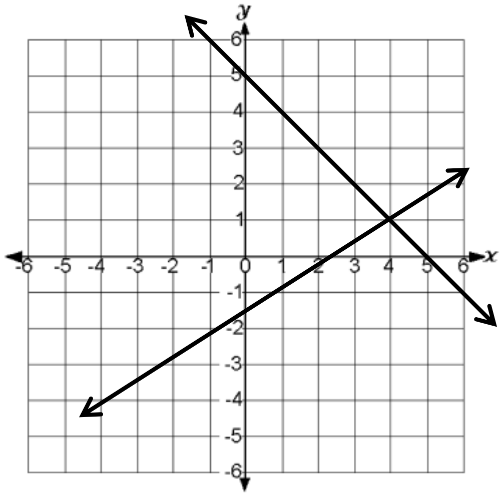
A) $y + 7 = -5(x - 3)$

B) $5x + y = -8$

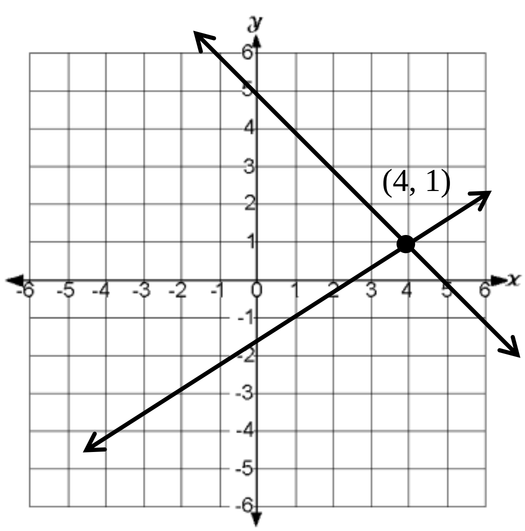
C) $y = -5x - 8$

D) $-3x + 7y = -5$

5 Which point appears to be the solution of the linear system graphed below?



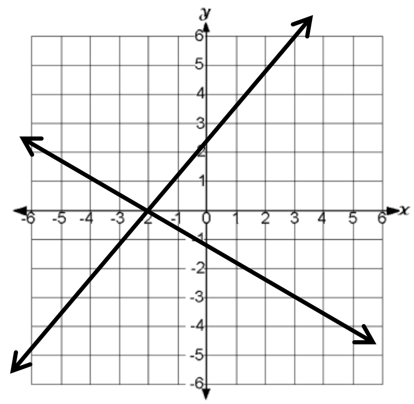
Solution: The solution to a linear system is the point that is a solution to both linear equations. This means that the point that is a solution will be the point that lies on both lines (or the point of intersection).



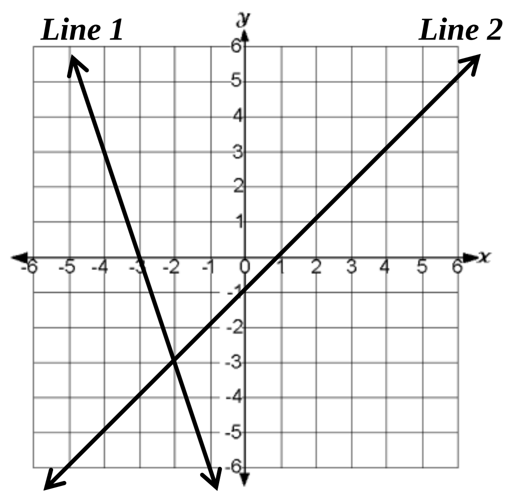
These lines intersect at the point (4, 1). Therefore the solution to this linear system is the point (4, 1).

A-REI.11

5a´ You try:
Which point appears to be the solution of the linear system graphed below?



5b´ You try:
Select *all* of the statements that are true about the graph of the system shown below.



Mark all correct answers.
Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

A) The solution to the system is (–2, –3).

B) There are an infinite number of solutions.

C) The lines intersect at (–3, –2).

D) The slope of Line 1 is negative.

E) The slope of Line 2 is negative.

6 Graph the solution set to the system of inequalities.

$$\begin{cases} y > -x - 2 & \text{Inequality 1} \\ -3x + y \le 6 & \text{Inequality 2} \end{cases}$$

1. Graph Inequality 1

$y > -x - 2$

slope : $-1 = \frac{-1}{1}$

y – intercept : (0, – 2)

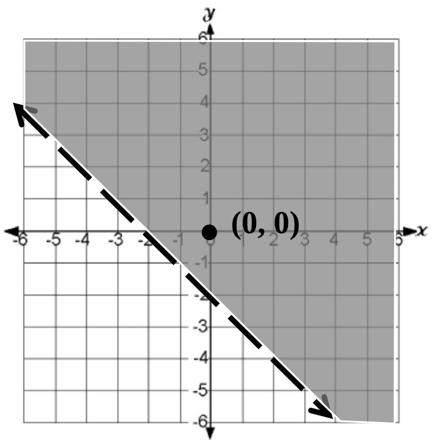
$>$ use a dashed line

Test point $(0, 0)$

$0 > -(0) - 2$

$0 > 0 - 2$

$0 > -2$ TRUE



So, shade the half-plane with the point (0, 0).

2. Graph Inequality 2 (Change to slope-intercept form first)

$-3x + y \le 6$

$-3x + 3x + y \le 6 + 3x$

$y \le 3x + 6$

slope : $3 = \frac{3}{1}$

y – intercept : (0, 6)

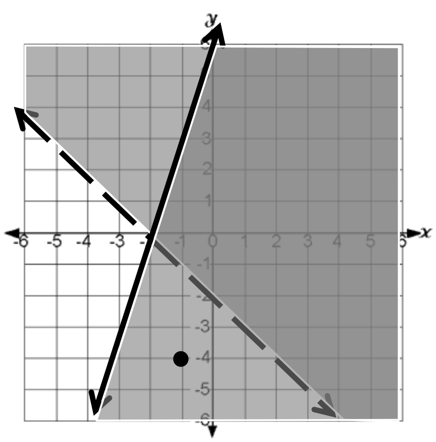
$\le$ use a solid line

Test point $(-1, -4)$

$-4 \le 3(-1) + 6$

$-4 \le -3 + 6$

$-4 \le 3$ TRUE



So, shade the half-plane with the point (–1, –4).

3. The graph of the system is the intersection of half-planes. Check a point in that intersection.

Test point $(2, 1)$

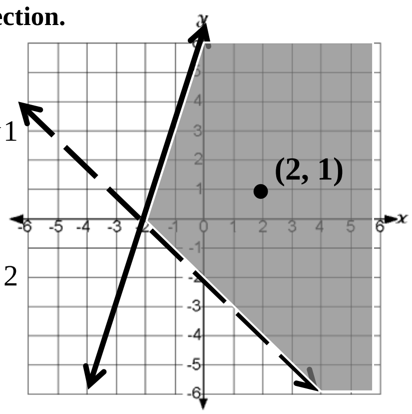
$1 > -(2) - 2$ Inequality 1

$1 > -4$ TRUE

$-3(2) + 1 \le 6$ Inequality 2

$-6 + 1 \le 6$

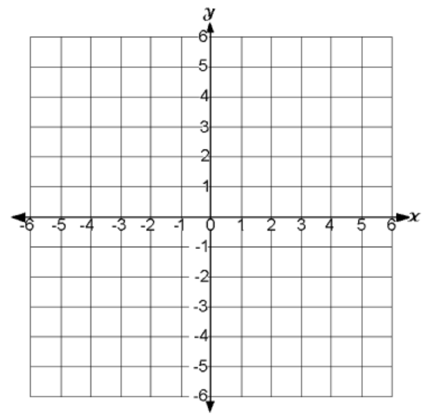
$-5 \le 6$ TRUE



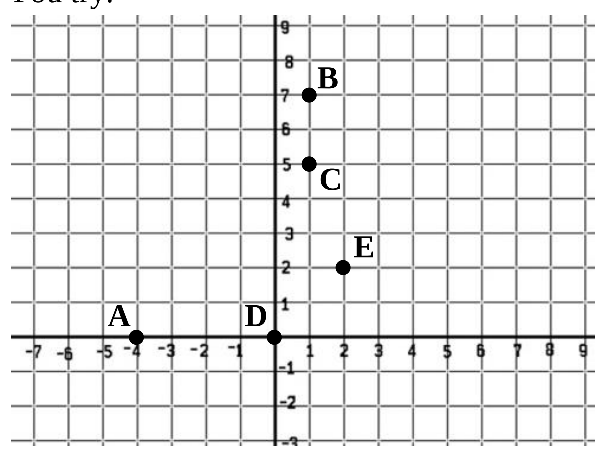
A-REI.12

6a´ You try:
Graph the solution to this system of inequalities.

$$\begin{cases} y \le x + 3 \\ 2x + y < 6 \end{cases}$$



6b´ You try:



Select *all* of the points on this coordinate plane that are solutions to the system below.

$$\begin{cases} y < x + 4 \\ x + y < 6 \end{cases}$$

Mark all correct answers.
Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ

A) Point A
B) Point B
C) Point C
D) Point D
E) Point E

7 **a)** Simplify $\left(4x^2y\right)^3$

Method 1: **Expansion**

$$\begin{aligned}&\left(4x^2y\right)^3\\ &=\left(4x^2y\right)\left(4x^2y\right)\left(4x^2y\right) && \text{Expand}\\ &=(4\bullet4\bullet4)\left(x^2\bullet x^2\bullet x^2\right)(y\bullet y\bullet y) && \text{Group like factors}\\ &=64(x\bullet x\bullet x\bullet x\bullet x\bullet x)\left(y^3\right) && \text{Multiply \& expand } x^2\\ &=64x^6y^3 && \text{Multiply}\end{aligned}$$

Method 2: Exponent Properties

$$\begin{aligned}&\left(4x^2y\right)^3\\ &=\left(4^1x^2y^1\right)^3 && \text{Rewrite with exponents of 1}\\ &=4^{1\bullet3}x^{2\bullet3}y^{1\bullet3} && \text{Power of a Power Rule}\\ &=4^3x^6y^3 && \text{Multiply exponents}\\ &=64x^6y^3 && \text{Simplify } 4^3\end{aligned}$$

b) Simplify $\dfrac{27a^3b^3}{18a^4b}$

Method 1: Expansion

$$\begin{aligned}&\frac{27a^3b^3}{18a^4b}\\ &=\frac{3\bullet3\bullet3\bullet a\bullet a\bullet a\bullet b\bullet b\bullet b}{2\bullet3\bullet3\bullet a\bullet a\bullet a\bullet a\bullet b} && \text{Expand to primes}\\ &=\frac{3\bullet3\bullet3\bullet a\bullet a\bullet a\bullet b\bullet b\bullet b}{2\bullet3\bullet3\bullet a\bullet a\bullet a\bullet a\bullet b} && \text{Find equivalent ones}\\ &=\frac{3b^2}{2a} && \text{Simplify}\end{aligned}$$

Method 2: **Exponent Properties**

$$\begin{aligned}&\frac{27a^3b^3}{18a^4b}=\frac{27}{18}\bullet\frac{a^3}{a^4}\bullet\frac{b^3}{b^1} && \text{Decompose like factors}\\ &=\frac{3}{2}\bullet a^{-1}\bullet b^2 && \text{Quotient of Powers Property}\\ &=\frac{3b^2}{2a} && \text{Negative Exponent Property}\end{aligned}$$

N-RN.2

7a´ You try:

1) Simplify $\left(-2xy^4z^2\right)^2$

2) Simplify $-\dfrac{10x^3y^4}{25xy^4}$

7b´ You try:

Select *all* of the following expressions that are equivalent to $\dfrac{30a^4b^2}{25ab^6}$

Mark all correct answers.

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ

A) $6a^3b^{-4}$

B) $\dfrac{6}{5}a^{4-1}b^{2-6}$

C) $\dfrac{6a^3}{5b^4}$

D) $\dfrac{1}{5a^3}\bullet6b^4$

E) $\dfrac{2\cdot3\cdot5\cdot a\cdot a\cdot a\cdot a\cdot b\cdot b}{5\cdot5\cdot a\cdot b\cdot b\cdot b\cdot b\cdot b\cdot b}$

F) $\dfrac{\left(3b^2\right)\left(3a^2\right)^2}{a\left(5b\right)^3}$

8 Factor the trinomial $x^2 + 3x - 70$

Is there a GCF other than 1? *No.*

Guess & Check Method
Using an Area Model, fill in a Generic Rectangle with the first and last terms.

x^2	
	-70

Given x^2 is the area (product), the dimensions (factors) have to be x and x.

	x	
x	x^2	
		-70

Using number sense and intuition, we GUESS which factors will give us a product of -70 and when combined as the middle (linear) term will give us $+3x$.

	x	-7
x	x^2	
$+10$		-70

When we fill in our generic rectangle, our diagonal terms will be our like terms and we can CHECK if they do combine to $+3x$.

	x	-7
x	x^2	$-7x$
$+10$	$+10x$	-70

$$\therefore\ x^2 + 3x - 70$$
$$= (x+10)(x-7)$$

A-SSE.2

8a′ You try:
Factor the trinomial $x^2 + 2x - 24$ using an Area Model.

9 Factor the trinomial $3x^2 - 11x - 70$

Is there a GCF other than 1? *No.*

Guess & Check Method

If the trinomial $3x^2 - 11x - 70$ is factorable, we know that it will factor into the product of two binomials.

$$3x^2 - 11x - 70$$
$$= (\quad)(\quad)$$

Understanding FOIL, we know that if the First term of the trinomial is $3x^2$, then the First terms of the binomials both have to be $3x$ and x.

$$3x^2 - 11x - 70$$
$$= (3x \quad)(x \quad)$$

We know the signs have to be + and – but because the factors of -70 will be multiplied by $3x$ and x it matters where we put them. Using number sense and intuition, we GUESS which factors will give us the Last term of -70 and when combined the middle term of $-11x$, once again remembering that one of the factors will be multiplied by $3x$ and the other by x.

$$3x^2 - 11x - 70$$
$$= (3x + 10)(x - 7)$$

Since we chose our First and Last terms specifically to get $3x^2$ and -70, we need only CHECK the OI, the Outer and Inner terms.

$$(3x + 10)(x - 7)$$

$$-21x + 10x = -11x$$

It checks.

$$\therefore\ 3x^2 - 11x - 70$$
$$= (3x + 10)(x - 7)$$

A-SSE.2

9a´ You try:
Factor the trinomial algebraically using guess and check.

$$2x^2 + 13x + 21$$

9b´ You try:
Match each trinomial with its factored form.

1) $x^2 + 16x + 48$ _____ Ⓐ Prime

2) $x^2 + 14x + 48$ _____ Ⓑ $(x - 3)(x - 16)$

3) $x^2 - 19x + 48$ _____ Ⓒ $(x + 4)(x + 12)$

4) $x^2 - 20x + 48$ _____ Ⓓ $(x - 2)(x - 24)$

5) $x^2 - 26x + 48$ _____ Ⓔ $(x + 6)(x + 8)$

10

Find the roots (zeros, x-intercepts) of $f(x) = x^2 + 2x - 24$

<u>Method</u>: Guess and Check Using Area Model

Using an Area Model, fill in a Generic Rectangle with the first and last terms.

x^2	
	-24

Given x^2 is the area (product), the dimensions (factors) have to be x and x. Also, given –24 is the area, we try dimensions 6 and –4.

	x	6
x	x^2	
-4		-24

Filling in our generic rectangle, we can check our diagonal terms to make sure they add to $2x$.

	x	6
x	x^2	$6x$
-4	$-4x$	-24

$\therefore\ f(x) = (x-4)(x+6)$

or $f(x) = (x+6)(x-4)$

Since we are asked to find the zeros of this function, we want to set the function equal to zero and solve for x.

$0 = (x-4)(x+6)$

$0 = x - 4$ or $0 = x + 6$

$x = 4$ or $x = -6$

A-SSE.3a

10a´

You try:
Find the zeros of $f(x) = 3x^2 + 7x + 2$

10b´

You try:
Select *all* of the following that are true about the function: $f(x) = x^2 - 4x - 60$

Mark all correct answers.
Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ

A) $f(x) = (x+10)(x-6)$

B) $f(x) = (x-10)(x+6)$

C) $f(x) = (x-10)(x-6)$

D) The zeros of this function are at $x = -10$ and $x = 6$.

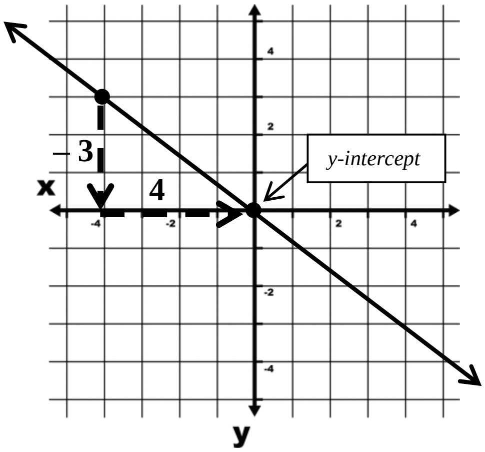
E) The zeros of this function are at $x = -6$ and $x = 10$.

F) The zeros of this function are at $x = -10$ and $x = -6$.

End of Study Guide

You Try Solutions:

1a´ What is the equation of the line on the graph below?



Solution: To identify the slope from a graph, locate two points and use the $\frac{rise}{run}$ ratio or subtract using the slope formula.

$$m = \frac{rise}{run} = -\frac{3}{4}$$

OR

$m = \frac{y_2 - y_1}{x_2 - x_1}$	Write the slope formula
$m = \frac{0-3}{0-(-4)}$	Substitute the coordinates of the points
$m = -\frac{3}{4}$	Simplify

The *y*-intercept is the *y*-coordinate of the point on the line that crosses the *y*-axis, which is at 0. Substitute the values of the slope and *y*-int.

$y = mx + b$	Write the equation
$y = -\frac{3}{4}x + 0$	Substitute $-\frac{3}{4}$ for *m* and 0 for *b*.
$y = -\frac{3}{4}x$	Simplify

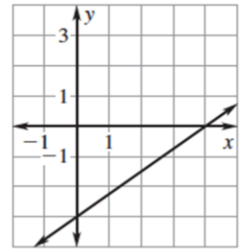
For Standard Form ($Ax + By = C$):

$y = -\frac{3}{4}x$	Write slope-intercept form
$\frac{3}{4}x + y = -\frac{3}{4}x + \frac{3}{4}x$	Inverse operations: zero pairs
$\frac{3}{4}x + y = 0$	Simplify
$4 \bullet \frac{3}{4}x + 4 \bullet y = 4 \bullet 0$	Multiply w/ LCD to clear fractions
$3x + 4y = 0$	Simplify

1b´ Match each equation with its graph.

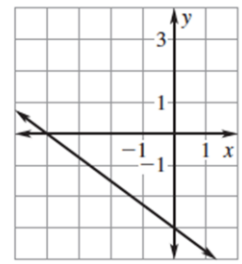
1) $3x + 4y = 12$ __C__

A.



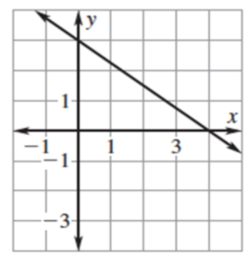
2) $3x + 4y = -12$ __B__

B.



3) $3x - 4y = 12$ __A__

C.



2a´ Find the x- and y-intercepts and the rate of change of
$2x + y = -5$

Find the x- and y-intercepts

The x-intercept is the point where the graph crosses the x-axis (or where y is zero). To find this from the equation, substitute $y = 0$ & solve for x.

$$2x + y = -5$$
$$2x + 0 = -5$$
$$2x = -5$$
$$x = -\frac{5}{2}$$
$$\left(-\frac{5}{2}, 0\right)$$

The y-intercept is the point where the graph crosses the y-axis (or where x is zero). To find this from the equation, substitute $x = 0$ & solve for y.

$$2x + y = -5$$
$$2(0) + y = -5$$
$$0 + y = -5$$
$$y = -5$$
$$(0, -5)$$

Find the rate of change

One method to find the rate of change/slope is to put the equation in slope-intercept form.

$$2x + y = -5$$
$$2x - 2x + y = -2x - 5 \quad \text{Inverse operations : zero pairs}$$
$$y = -2x - 5 \quad \text{Simplify}$$

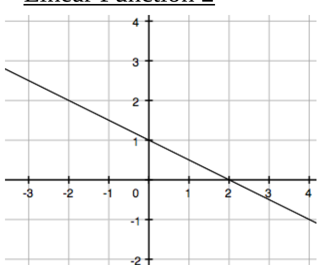
From this, we can tell that the rate of change is -2.
Because this rate is negative, the graph is decreasing

2b´ Given a linear function and the graph of a linear function below, select *all* of the following statements that are true.

Linear Function 1

$y = -3x + 1$

Linear Function 2



Mark all correct answers.

Ⓐ ● Ⓒ ● ●

A) These functions have the same x-intercept.

B) These functions have the same y-intercept.

C) Both functions are increasing on all intervals.

D) The rate of change for Function 1 is faster than the rate of change for Function 2.

E) The solution to the system containing both equations is (0, 1).

3a´ Determine the rate of change for

1) The equation $2x - y = 4$

This equation is in standard form. To find the rate of change (slope), we can put it in slope-intercept form.

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

From this we can determine that the slope is 2.

2) The table

x	y
3	5
5	5
7	5

To find the rate of change, we can use the slope formula with two points from the table. For this example, lets use (3, 5) and (7, 5).

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{5-5}{7-3} \quad \text{Substitute the points}$$
$$= \frac{0}{4} \quad \text{Simplify}$$
$$= 0 \quad \text{Simplify}$$

Therefore, the slope is 0.

3b´ Select *all* of the following that have the same slope or rate of change as the graph of the linear function $y = 2x - 1$.

Mark all correct answers.
(A) ● (C) ● (E)

A) (6, 2), (–1, 9)

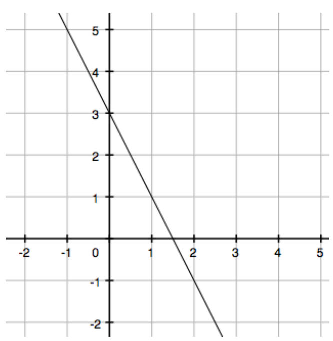
B) $4x - 2y = 8$

C) $y = -1$

D)

x	y
–4	6
–2	10
0	14

E)



4a´ Write an equation of the line that passes through the point (–8, 3) with a slope of $\frac{3}{4}$, in slope-intercept form, point-slope form, AND standard form.

Solution: Slope-Intercept Form

$y = mx + b$ Write slope - intercept form

$3 = \frac{3}{4}(-8) + b$ Substitute $\frac{3}{4}$ for m, –8 for x, and 3 for y.

$3 = -6 + b$ Multiply

$3 + 6 = -6 + 6 + b$ Inverse operations : zero pairs

$9 = b$ Simplify

$y = \frac{3}{4}x + 9$ Substitute $\frac{3}{4}$ for m and 9 for b

Solution: Point-Slope Form

$y - y_1 = m(x - x_1)$ Write point-slope form

$y - 3 = \frac{3}{4}(x - (-8))$ Substitute 3 for y_1, $\frac{3}{4}$ for m, –8 for x_1

$y - 3 = \frac{3}{4}(x + 8)$ Simplify

Solution: Standard Form

$y = \frac{3}{4}x + 9$ Write slope-intercept form

$-\frac{3}{4}x + y = \frac{3}{4}x - \frac{3}{4}x + 9$ Inverse operations: zero pairs

$-\frac{3}{4}x + y = 9$ Simplify

$-4(-\frac{3}{4}x) + -4(y) = -4(9)$ Multiply with LCD

$3x - 4y = -36$ Simplify

4b´ Select *all* of the following equations of a line that have a slope of –5 and pass through the point (–3, 7).

Mark all correct answers.
(A) ● ● (D)

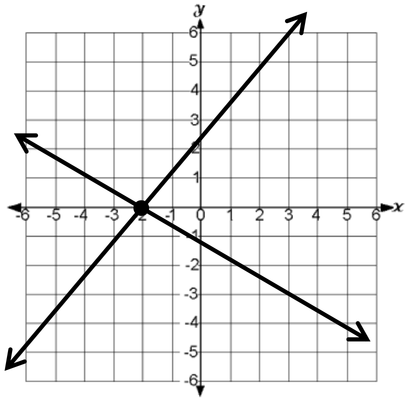
A) $y + 7 = -5(x - 3)$

B) $5x + y = -8$

C) $y = -5x - 8$

D) $-3x + 7y = -5$

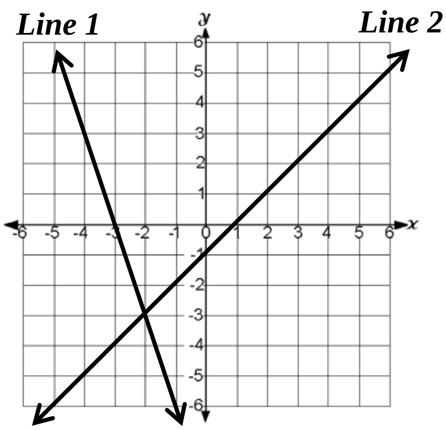
5a´ Which point appears to be the solution of the linear system graphed below?



Solution: The solution to a linear system is the point that is a solution to both linear equations. This means that the point that is a solution will be the point that lies on both lines (or the point of intersection).

These lines intersect at the point (–2, 0), therefore the solution to this linear system is the point (–2, 0).

5b´ Select *all* of the statements that are true about the graph of the system shown below.



Mark all correct answers.

● (B) (C) ● (E)

A) The solution to the system is (–2, –3).

B) There are an infinite number of solutions.

C) The lines intersect at (–3, –2).

D) The slope of Line 1 is negative.

E) The slope of Line 2 is negative.

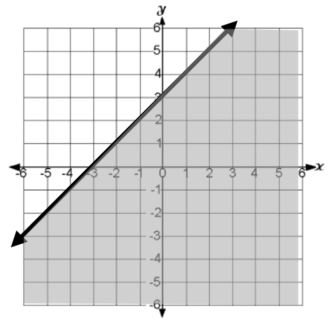
6a´ Graph the solution to this system of inequalities.

$$\begin{cases} y \le x+3 \\ 2x+y<6 \end{cases}$$

$y \le x + 3$

$m = \frac{1}{1}$, $b = (0, 3)$

Solid line, shaded below.

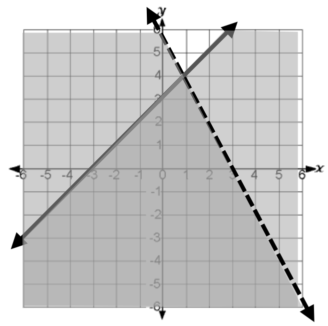


$2x + y < 6$

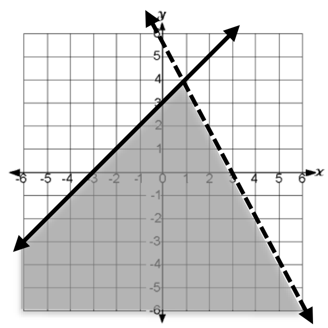
$y < -2x + 6$

$m = \frac{-2}{1}$, $b = (0, 6)$

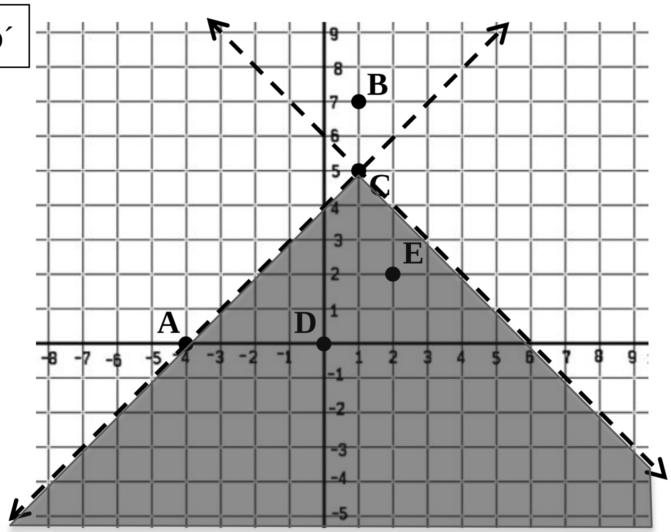
Dotted line, shaded below.



The intersection of the shaded half-planes is the solution set to the system of inequalities.



6b´



Select *all* of the points on this coordinate plane that are solutions to the system below.

$$\begin{cases} y < x + 4 \\ x + y < 6 \end{cases}$$

Mark all correct answers.

Ⓐ Ⓑ Ⓒ ● ●

A) Point A
B) Point B
C) Point C
D) Point D
E) Point E

7a´ **1)** Simplify $(-2xy^4z^2)^2$

Method 1: Expansion

$(-2xy^4z^2)^2$

$= (-2xy^4z^2)(-2xy^4z^2)$ Expand

$= (-2 \cdot -2)(x \cdot x)(y^4 \cdot y^4)(z^2 \cdot z^2)$ Group like factors

$= 4x^2(y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y)(z \cdot z \cdot z \cdot z)$ Multiply & expand y^4 & z^2

$= 4x^2y^8z^4$ Multiply

Method 2: Exponent Properties

$(-2xy^4z^2)^2$

$= [(-2)^1x^1y^4z^2]^2$ Rewrite with exponents of 1

$= (-2)^{1 \cdot 2}x^{1 \cdot 2}y^{4 \cdot 2}z^{2 \cdot 2}$ Power of a Power Rule

$= (-2)^2x^2y^8z^4$ Multiply exponents

$= 4x^2y^8z^4$ Simplify $(-2)^2$

2) Simplify $-\dfrac{10x^3y^4}{25xy^4}$

Method 1: Expansion

$-\dfrac{10x^3y^4}{25xy^4}$

$= -\dfrac{2 \cdot 5 \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y}{5 \cdot 5 \cdot x \cdot y \cdot y \cdot y \cdot y}$ Expand to primes

$= -\dfrac{2 \cdot 5 \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y}{5 \cdot 5 \cdot x \cdot y \cdot y \cdot y \cdot y}$ Find equivalent ones

$= -\dfrac{2x^2}{5}$ Simplify

Method 2: Exponent Properties

$-\dfrac{10x^3y^4}{25xy^4}$

$= -\dfrac{10}{25} \cdot \dfrac{x^3}{x^1} \cdot \dfrac{y^4}{y^4}$ Decompose like factors

$= -\dfrac{2}{5} \cdot x^2 \cdot y^0$ Quotient of Powers Property

$= -\dfrac{2x^2}{5}$ Zero Exponent Property

7b´ Select *all* of the following expressions that are equivalent to $\frac{30a^4b^2}{25ab^6}$

Mark all correct answers.

Ⓐ ● ● Ⓓ ● Ⓕ

A) $6a^3b^{-4}$

B) $\frac{6}{5}a^{4-1}b^{2-6}$

C) $\frac{6a^3}{5b^4}$

D) $\frac{1}{5a^3}\bullet 6b^4$

E) $\frac{2\cdot 3\cdot 5\cdot a\cdot a\cdot a\cdot a\cdot b\cdot b}{5\cdot 5\cdot a\cdot b\cdot b\cdot b\cdot b\cdot b\cdot b}$

F) $\frac{(3b^2)(3a^2)^2}{a(5b)^3}$

8a´ Factor the trinomial $x^2+2x-24$ using an Area Model.

It's an expression with no GCF other than 1. Fill in the first and last terms of the trinomial.

x^2	
	-24

To get a product of x^2, the factors have to be x and x.

	x	
x	x^2	
		-24

The signs have to be + and – because the last term of the trinomial is negative. It does not matter where they are put because the first terms of both binomials are the same.

Because the trinomial has a leading coefficient of 1 and the middle term is positive, the larger factor of 24 has to be positive. Also, because the middle term of the trinomial is close to 0, the factors chosen should be closer together.

	x	$+6$
x	x^2	$+6x$
-4	$-4x$	-24

$\therefore\ x^2+2x-24$
$=(x-4)(x+6)$

9a´

You try:
Factor the trinomial $2x^2 + 13x + 21$ algebraically using guess and check.

It's an expression with no GCF other than 1. To get a product of $2x^2$, the first binomial terms have to be $2x$ and x.

$$= (2x \quad)(x \quad)$$

The signs have to be + and + because the third term is + and the middle term is +.

$$= (2x + \quad)(x + \quad)$$

Since the middle term of the trinomial is fairly small, especially considering one of the binomial factors of 21 will be multiplied by $2x$, the factors chosen should be closer together.

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

$$6x + 7x = 13x$$

It checks.

$$\therefore\ 2x^2 + 13x + 21 = (2x+7)(x+3)$$

9b´

Match each trinomial with its factored form.

1) $x^2 + 16x + 48$ __C__
2) $x^2 + 14x + 48$ __E__
3) $x^2 - 19x + 48$ __B__
4) $x^2 - 20x + 48$ __A__
5) $x^2 - 26x + 48$ __D__

(A) Prime
(B) $(x-3)(x-16)$
(C) $(x+4)(x+12)$
(D) $(x-2)(x-24)$
(E) $(x+6)(x+8)$

10a´

Find the zeros of $f(x) = 3x^2 + 7x + 2$

Method: Guess & Check Algebraically

$$f(x) = 3x^2 + 7x + 2$$
$$= (3x \quad)(x \quad)$$
$$= (3x + \quad)(x + \quad)$$
$$= (3x+1)(x+2)$$

"Check the Outer and Inner"

$$6x + x = 7x$$

It checks.

We are looking for the zeros. We want to solve for x when $f(x) = 0$.

$$(3x+1)(x+2) = 0$$

$3x + 1 = 0$ OR $x + 2 = 0$

$3x = -1$ $\qquad x = -2$

$x = -\frac{1}{3}$

10b´

Select *all* of the following that are true about the function: $f(x) = x^2 - 4x - 60$

Mark all correct answers.
(A) ● (C) (D) ● (F)

A) $f(x) = (x+10)(x-6)$

B) $f(x) = (x-10)(x+6)$

C) $f(x) = (x-10)(x-6)$

D) The zeros of this function are at $x = -10$ and $x = 6$.

E) The zeros of this function are at $x = -6$ and $x = 10$.

F) The zeros of this function are at $x = -10$ and $x = -6$.