system of equations: A set of two or more equations.

Example: $-3x + 2y = 8$
$x + 2y = -8$

linear system: consists of linear equations {form a straight line, when graphed}

solution of a system: A set of values for the variables that makes all equations, in the system, true. **The point at which the lines intersect.**

What is the solution of the system?

-3x + 2y = 8

x + 2y = -8

Graph each equation by getting into **slope-intercept form**, **y = mx + b**

m is the **slope**

b is the **y-intercept**

-3x + 2y = 8 {first equation}

+3x +3x

2y = 3x + 8 {added 3x to each side}

$y = \frac{3}{2}x + 4$ {divided each side by 2}

slope = $\frac{3}{2}$

y-intercept = 4

x + 2y = -8 {second equation}

-x -x

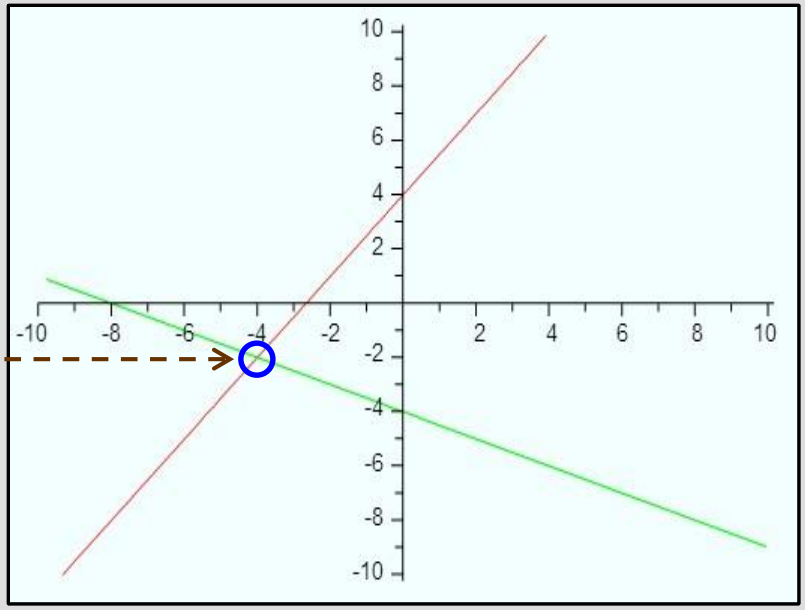
2y = -x – 8 {subtracted x from each side}

$y = -\frac{1}{2}x - 4$ {divided each side by 2}

slope = $-\frac{1}{2}$

y-intercept = -4

solution of the system appears to be (-4 , -2)



check in each equation

-3x + 2y = 8

-3(-4) + 2(-2) = 8

12 – 4 = 8

8 = 8 ☑

x + 2y = -8

-4 + 2(-2) = -8

-4 – 4 = -8

-8 = -8 ☑

(-4 , -2) is the solution of the system

Find the point of intersection of the two lines:

$2x + 4y = 12$

$x + y = 2$

Graph each equation by getting into **slope-intercept form**, **y = mx + b**

m is the **slope**

b is the **y-intercept**

$2x + 4y = 12$ {first equation}

$-2x \quad -2x$

$4y = -2x + 12$ {subtracted 2x from each side}

$y = -\frac{1}{2}x + 3$ {divided each side by 4}

slope = $-\frac{1}{2}$

y-intercept = 3

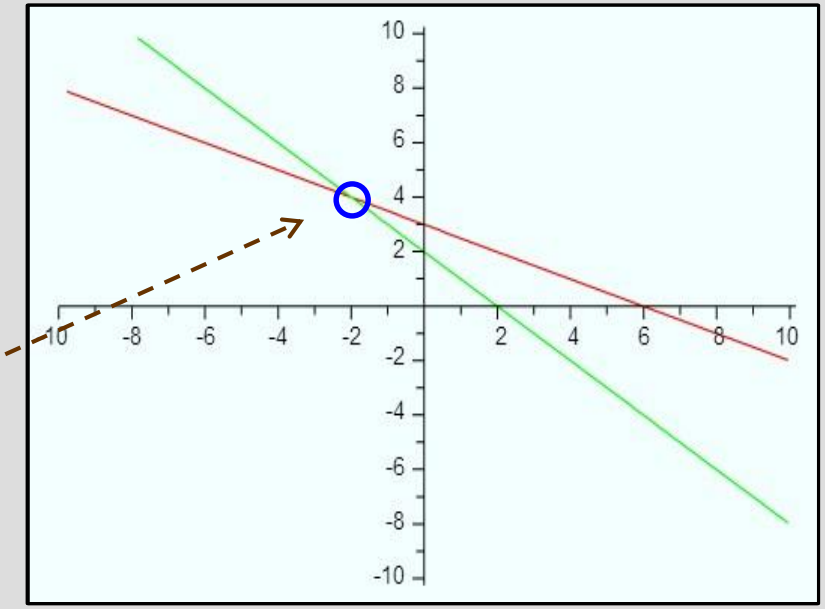
$x + y = 2$ {second equation}

$-x \quad -x$

$y = -x + 2$ {subtracted x from each side}

slope = -1

y-intercept = 2



point of intersection appears to be (-2 , 4)

check in each equation

$2x + 4y = 12$

$2(-2) + 4(4) = 12$

$-4 + 16 = 12$

$12 = 12$ ☑

$x + y = 2$

$-2 + 4 = 2$

$2 = 2$ ☑

(-2 , 4) is the point of intersection {solution} of the two lines {equations}

Which ordered pair of numbers is the solution of the system? $\begin{cases} 2x + 3y = 12 \\ 2x - y = 4 \end{cases}$

F $(2, 3)$ G $(3, 2)$ H $(1, -2)$ I $(-3, 6)$

The solution will satisfy each equation {make a true statement in each equation}

2x + 3y = 12 {first equation}
2(-3) + 3(6) = 12 {substituted -3 for x and 6 for y}
-6 + 18 = 12 {multiplied}
12 = 12 {added -6 and 18}
☑

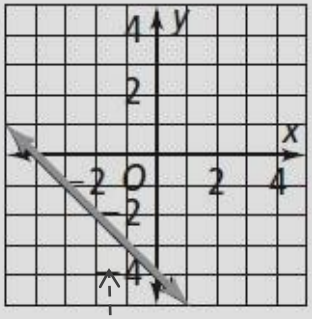
2x – y = 4 {second equation}
2(-3) – 6 = 4 {substituted -3 for x and 6 for y}
-6 – 6 = 4 {multiplied}
-12 = 4 {subtracted}
☒

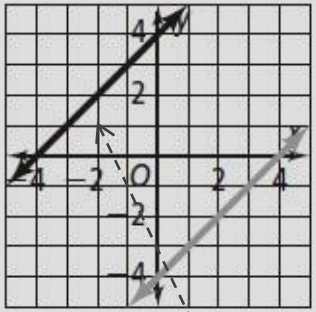
2x + 3y = 12 {first equation}
2(3) + 3(2) = 12 {substituted 3 for x and 2 for y}
6 + 6 = 12 {multiplied}
12 = 12 {added 6 and 6}
☑

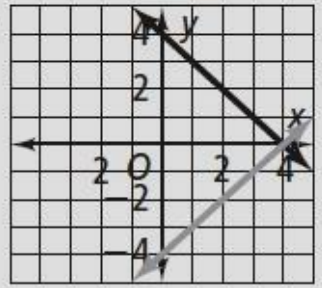
2x – y = 4 {second equation}
2(3) – 2 = 4 {substituted 3 for x and 2 for y}
6 – 2 = 4 {multiplied}
4 = 4 {subtracted}
☑

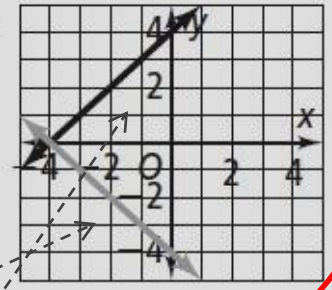
Which of the following graphs shows the solution of the system?

$$\begin{cases} x + y = -4 \\ 2x - 2y = -8 \end{cases}$$

A 

B 

C 

D 

Get each equation in slope-intercept form, y = mx + b
m is the slope
b is the y-intercept

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{vertical change}}{\text{horizontal change}}$$

x + y = -4 {first equation}
-x -x
y = -x – 4 {subtracted x from each side}

slope = -1 {which is $\frac{-1}{1}$ in the form of $\frac{\text{rise}}{\text{run}}$}
y-intercept = -4 {where the line crosses the y-axis}

2x – 2y = -8 {second equation}
-2x -2x
-2y = -2x – 8 {subtracted 2x from each side}
y = x + 4 {divided each side by -2}

slope = 1 {which is $\frac{1}{1}$ in the form of $\frac{\text{rise}}{\text{run}}$}
y-intercept = 4 {where the line crosses the y-axis}

You and your friend are both knitting scarves for charity. You knit 8 rows each minute and already have knitted 10 rows. Your friend knits 5 rows each minute and has already knitted 19 rows. When will you both have knitted the same number of rows?

F 2.6 minutes G 3 minutes H 9.7 minutes I 34 minutes

Let x be the number of minutes and y be the number of rows

You knit 8 rows per minute and already knitted 10 rows

$y = 8x + 10$ {8 times the number of minutes (x) plus the number of rows already (y)}

Your friend knits 5 rows per minute and already knitted 19 rows

$y = 5x + 19$ {5 times the number of minutes (x), plus the number of rows already (y)}

A graphing calculator could be used to find the point of intersection.