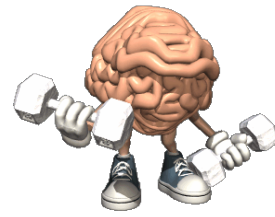


# Warm Up



Solve the following systems of equations using Graphing

$$3x + 4y = -4$$

$$\frac{4y}{4} = \frac{-3x - 4}{4}$$

$$y = -\frac{3}{4}x - 1$$

$$m = -\frac{3}{4} \quad b = -1$$

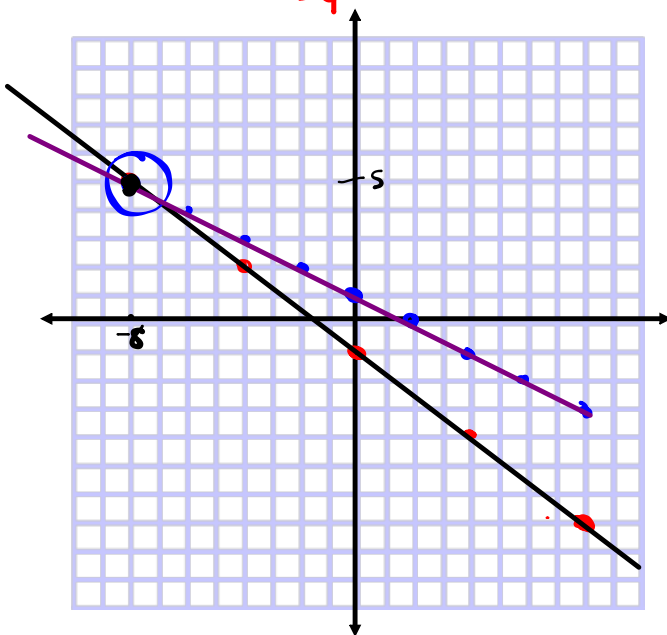
or  $\frac{+3}{-4}$

$$x + 2y = 2$$

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

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

$$m = -\frac{1}{2} \quad b = 1$$



point of intersection  
 $(-8, 5)$   
 $\begin{matrix} x \\ y \end{matrix}$

Verify

$$3x + 4y = -4$$

$$3(-8) + 4(5)$$

$$(-24) + (+20)$$

$$-4 \leftarrow \text{same}$$

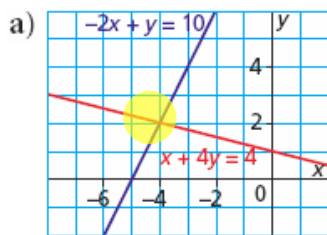
$$x + 2y = 2$$

$$-8 + 2(5)$$

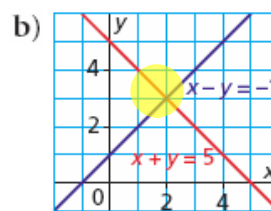
$$-8 + 10$$

$$+2 \leftarrow \text{same}$$

3. Determine the solution of each linear system.



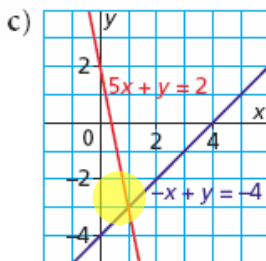
$x = -4, y = 2$



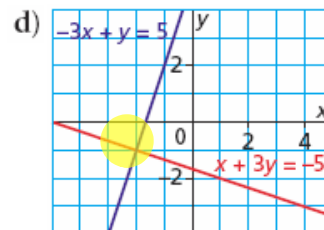
$x = 2, y = 3$



3. a)  $x = -4, y = 2$   
 b)  $x = 2, y = 3$   
 c)  $x = 1, y = -3$   
 d)  $x = -2, y = -1$



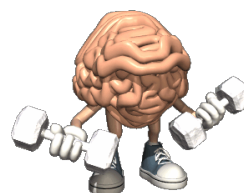
$x = 1, y = -3$



$x = -2, y = -1$



# Warm Up



Solve the following systems of equations using substitution

$$3x + 4y = -4 \quad (1)$$

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

Isolate  
a variable 'x'  
in equation 2

$$x = -2y + 2 \quad (3)$$

Use (1) and sub  $x = -2y + 2$  into it

$$(1) \quad 3(x) + 4y = -4$$

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

$$-6y + 6 + 4y = -4$$

$$-2y + 6 = -4 - 6$$

$$-2y = -10$$

$$y = 5$$

Sub  $y = 5$  in  $x = -2y + 2$

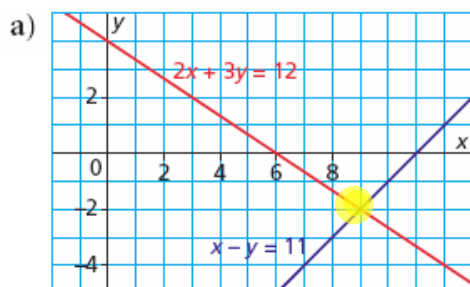
$$x = -2(5) + 2$$

$$x = -10 + 2$$

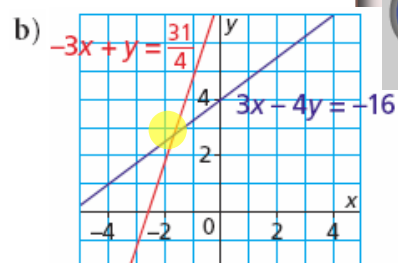
$$(x, y)$$

$$(-8, 5)$$

4. For each linear system, use the graphs to determine the solution.  
Explain how you know whether the solution is exact or approximate.



**$x=9$  ,  $y= -2$**   
**This is exact**



**$x= -1 \frac{3}{4}$  ,  $y= 2 \frac{3}{4}$**

**This is approximate**

5. a) Solve each linear system.

i)  $x + y = 7$  ①  
 $3x + 4y = 24$  ②



(1)  $x + y = 7$       $y = -x + 7$

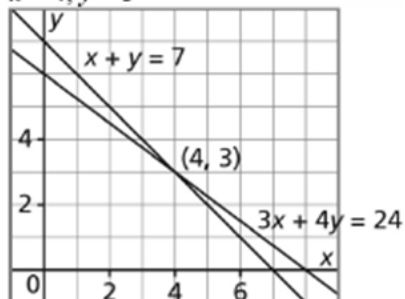
$y = -x + 7$

$m = -1$

y intercept = (0,7)

x intercept = (7,0)

a) i)  $x = 4, y = 3$



(2)  $3x + 4y = 24$

$4y = -3x + 24$

$y = \frac{-3x + 6}{4}$

$m = -3/4$

y intercept = (0,6)

x intercept = (8,0)

Method 2: Substitution

I like this one better

## 7.4 Using a Substitution Strategy to Solve a System of Linear Equations



## Solving Systems of Equations



There are a number of different ways in which to solve systems of equations. The second method we are going to look at is called **substitution**.



When we refer to solving a system of equations, we want to solve for a numerical value for one variable





**Rules for Substitution as a method for solving a system of equations.**

- **There must be the same number of equations as variables.**

- If there are two variables, there must be two equations; three variables, three equations, etc.

- **One of the equations can easily be substituted into the other equation to solve for one variable**

You try with Substitution

Solve the following systems of equations using substitution

$$\textcircled{1} \quad y - 3x = 5 \rightarrow y = \boxed{3x + 5}$$

$$\textcircled{2} \quad y + x = 3$$



Sub  $y = 3x + 5$  into  $\textcircled{2}$

$$\textcircled{2} \quad (y) + x = 3$$

$$\underline{3x+5} + \underline{x} = 3$$

$$4x + 5 - 5 = 3 - 5$$

$$\frac{4x}{4} = \frac{-2}{4}$$

Reduce

$$\boxed{x = -\frac{1}{2}}$$

Sub

$$y = 3x + 5$$

$$= 3\left(-\frac{1}{2}\right) + 5$$

$$= -\frac{3}{2} + 5$$

Need C.D

$$-\frac{3}{2} + \frac{10}{2}$$

$$\boxed{y = \frac{7}{2}}$$

$$x, y$$

$$\left(-\frac{1}{2}, \frac{7}{2}\right)$$

Solve the following systems of equations using substitution

$$\frac{1}{2}x + y = \frac{5}{2} \rightarrow \textcircled{1} x + 2y = 5$$

Hint: Get rid of fraction by multiplying by LCM

$$\frac{1}{3}x - \frac{1}{3}y = -\frac{1}{3} \rightarrow \textcircled{2} x - y = -1$$

① Isolate 'x'

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

$$\boxed{x = 5 - 2y} \textcircled{3}$$

Sub  $x = 5 - 2y$  into ②

$$(x) - y = -1$$

$$5 - 2y - y = -1$$

$$5 - 3y = -1 - 5$$

$$\frac{-3y}{-3} = \frac{-6}{-3}$$

$$\boxed{y = +2}$$

Sub  $y = +2$  in ③  $x = 5 - 2y$

$$x = 5 - 2(2)$$

$$= 5 - 4$$

$$\boxed{x = 1}$$

$$(1, 2)$$

Solve the following systems of equations using substitution

Could have used the fractions

$$\frac{1}{2}x + y = \frac{5}{2} \quad \text{---} \quad \textcircled{1} \quad y = \frac{-1x}{2} + \frac{5}{2}$$

$$\textcircled{2} \quad \frac{1}{3}x - \frac{1}{3}y = -\frac{1}{3}$$

$$\frac{1}{3}x - \frac{1}{3}\left(\frac{-1x}{2} + \frac{5}{2}\right) = -\frac{1}{3}$$

$$\frac{1}{3}x + \frac{1}{6} - \frac{5}{6} = -\frac{1}{3}$$

$$\frac{1}{3}x - \frac{4}{6} = -\frac{1}{3}$$

Reduce

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

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

$$\boxed{x = 1}$$

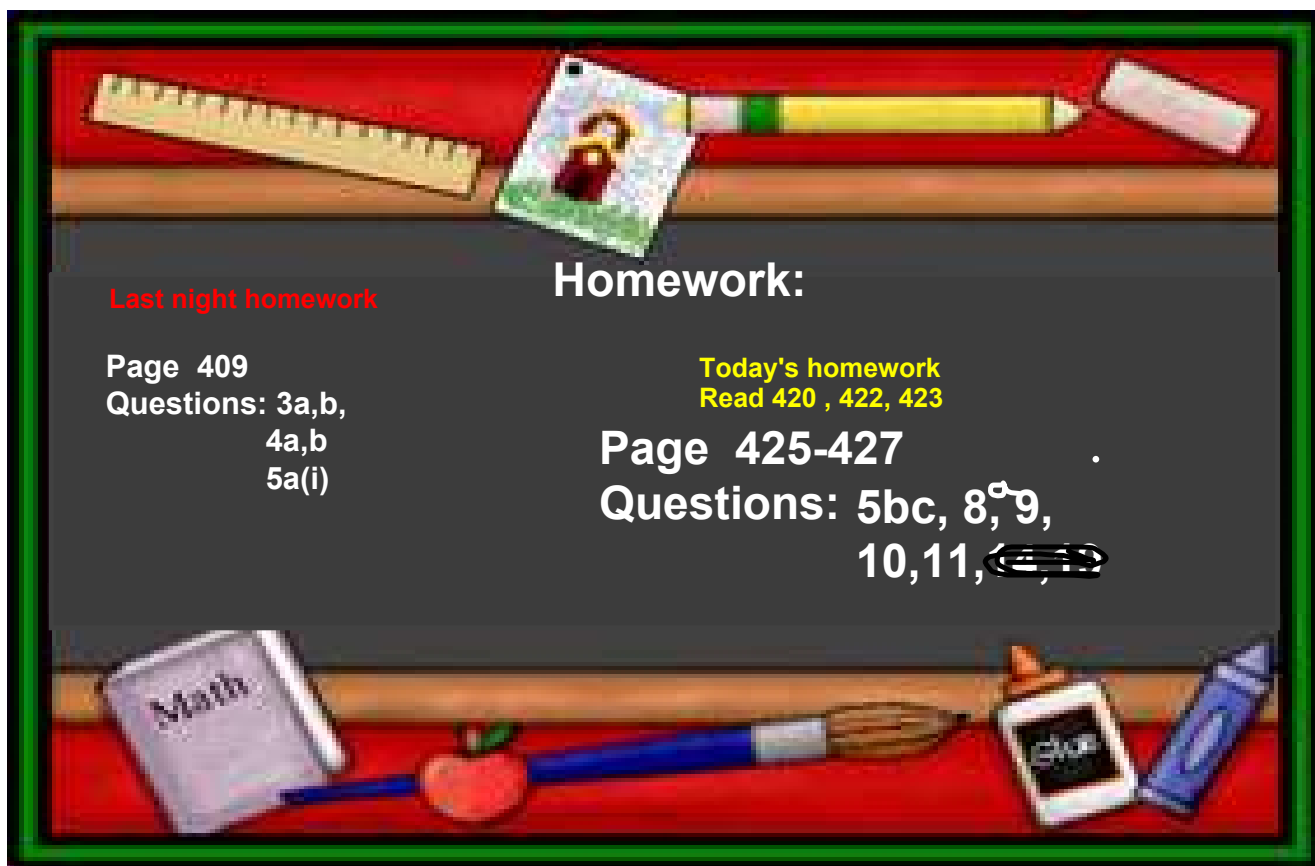
Sub into  $y = \frac{-1x}{2} + \frac{5}{2}$

$$= \frac{-1(1)}{2} + \frac{5}{2}$$

$$= \frac{-1}{2} + \frac{5}{2}$$

$$= \frac{4}{2}$$

$$\boxed{y = 2}$$



**Last night homework**

Page 409  
Questions: 3a,b,  
4a,b  
5a(i)

**Homework:**

**Today's homework**  
Read 420 , 422, 423

Page 425-427  
Questions: 5bc, 8, 9,  
10,11, ~~12~~