

## Warm Up

Given the following two equations solve for the point of intersection using graphing.

$$y = 3x + 3$$

$$y = mx + b$$

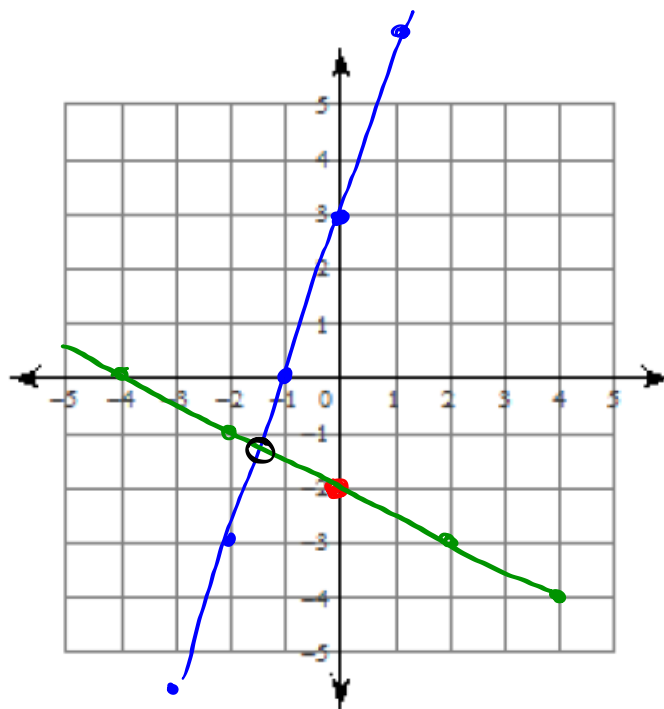
$$m = \frac{3}{1} \quad b = +3$$

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

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

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

Estimate  
 $(-1.5, -1.25)$



Given the following two equation solve for the point of intersection using graphing.

①  $x + 2y = 6 \rightarrow$  ③  $x = 6 - 2y$

②  $3x + y = 2$

Sub into ②

$3(6 - 2y) + y = 2$

$18 - 6y + y = 2$

$18 - 5y = 2 - 18$

$-5y = -16$   
 $y = \frac{16}{5}$

$y = \frac{16}{5}$

Sub ③

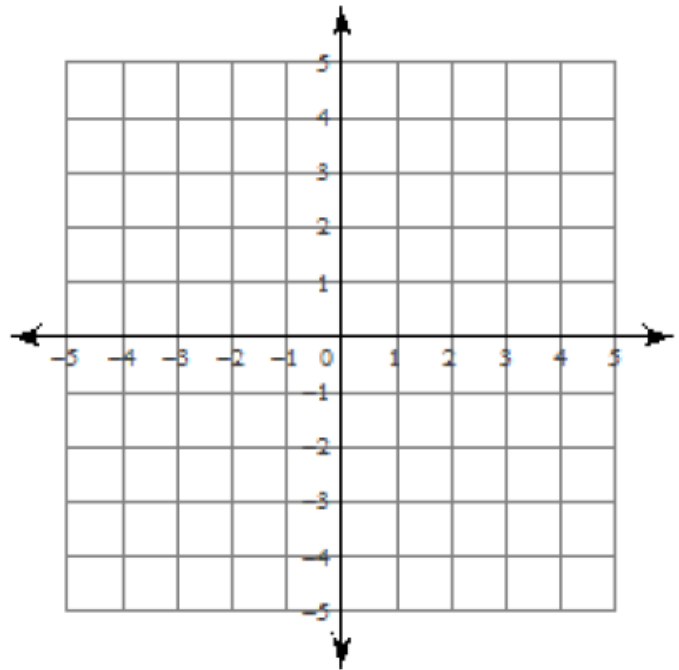
$x = 6 - 2y$

$= 6 - 2\left(\frac{16}{5}\right)$

$= \frac{6}{1} - \frac{32}{5}$

$= \frac{30}{5} - \frac{32}{5}$

$x = -\frac{2}{5}$



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Questions: 4, 5, 8, 9

4a) ①  $y = 9 - x$

②  $2x + 3y = 11$

-----  
 $2x + 3y = 11$

$2x + 3(9 - x) = 11$

$2x + 27 - 3x = 11$

$-x + 27 = 11$

$-x = 11 - 27$

$-x = -16$

$x = 16$

$y = 9 - x$

$y = 9 - 16$

$y = -7$

b)  $x = y - 1$

$3x - y = 11$

-----  
 $3(y - 1) - y = 11$

$3y - 3 - y = 11$

$2y - 3 = 11$

$2y = 11 + 3$

$2y = 14$

$y = 7$

$x = y - 1$

$x = 7 - 1$

$x = 6$

$$\begin{aligned} \text{c) } x &= 7 + y \\ 2x + y &= -10 \end{aligned}$$

$$2(7+y) + y = -10$$

$$14 + 2y + y = -10$$

$$14 + 3y = -10$$

$$3y = -10 - 14$$

$$3y = -24$$

$$\boxed{y = -8}$$

$$x = 7 + y$$

$$x = 7 + (-8)$$

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

$$\begin{aligned} \text{d) } 3x + y &= 7 \\ y &= x + 3 \end{aligned}$$

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

$$4x + 3 = 7$$

$$4x = 7 - 3$$

$$4x = 4$$

$$\boxed{x = 1}$$

$$y = x + 3$$

$$y = 1 + 3$$

$$\boxed{y = 4}$$

$$5) \textcircled{1} 2x + 3y = 11$$

$$\textcircled{2} 4x - y = -13$$

$$\textcircled{2} 4x - y = -13$$

$$-y = -4x - 13$$

$$y = 4x + 13$$

Substitute into equation 1

$$2x + 3y = 11$$

$$2x + 3(4x + 13) = 11$$

$$2x + 12x + 39 = 11$$

$$14x + 39 = 11$$

$$14x = 11 - 39$$

$$14x = -28$$

$$x = -2$$

Substitute back into to see what y =

$$y = 4x + 13$$

$$y = 4(-2) + 13$$

$$y = -8 + 13$$

$$y = 5$$

$$x = -2, y = 5$$

$$\textcircled{1} 4x + y = -5$$

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

$$\textcircled{1} 4x + y = -5$$

$$\textcircled{3} y = -4x - 5$$

Sub into equation 2

$$2x + 3y = 5$$

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

$$2x - 12x + 15 = 5$$

$$-10x + 15 = 5$$

$$-10x = 5 - 15$$

$$-10x = -10$$

$$x = 1$$

Sub into equation  
to solve for y

$$y = -4x - 5$$

$$y = -4(1) - 5$$

$$y = -4 - 5$$

$$y = -9$$

$$x = 1 \quad y = -9$$

$$\textcircled{\text{c}} \textcircled{1} x + 2y = 13 \rightarrow x = -2y + 13$$

$$\textcircled{2} 2x - 3y = -9$$

$$\textcircled{1} x + 2y = 13$$

$$\textcircled{3} x = -2y + 13$$

Sub into equation 2

$$2x - 3y = -9$$

$$2(-2y + 13) - 3y = -9$$

$$-4y + 26 - 3y = -9$$

$$-7y + 26 = -9$$

$$-7y = -9 - 26$$

$$-7y = -35$$

$$y = 5$$

Sub into equation to solve for x

$$x = -2y + 13$$

$$x = -2(5) + 13$$

$$x = -10 + 13$$

$$x = -3$$

$$x = -3, y = 5$$

$$\textcircled{\text{d}} \textcircled{1} 3x + y = 7$$

$$\textcircled{2} 5x + 2y = 13$$

$$\textcircled{1} 3x + y = 7$$

$$y = -3x + 7$$

Sub into equation 2

$$5x + 2y = 13$$

$$5x + 2(-3x + 7) = 13$$

$$5x - 6x + 14 = 13$$

$$-x + 14 = 13$$

$$-x = 13 - 14$$

$$-x = -1$$

$$x = 1$$

Sub into equation to solve for y

$$y = -3x + 7$$

$$y = -3(1) + 7$$

$$y = -3 + 7$$

$$y = 4$$

$$x = 1, y = -4$$

8a)  $\frac{x}{3} - \frac{y}{2} = 2$

$\frac{5x}{6} + \frac{3y}{4} = 1$

6  $\left[ \frac{x}{3} - \frac{y}{2} = 2 \right]$

12  $\left[ \frac{5x}{6} + \frac{3y}{4} = 1 \right]$

$\frac{6x}{3} - \frac{6y}{2} = 12$

$\frac{60x}{6} + \frac{36y}{4} = 12$

$2x - 3y = 12$

$10x + 9y = 12$

New equations to work with

①  $2x - 3y = 12$

②  $10x + 9y = 12$

Isolate  $x$  in ①

①  $2x - 3y = 12$

$2x = 3y + 12$

$x = \frac{3}{2}y + 6$

Sub into equation 2

$10x + 9y = 12$

$10\left(\frac{3}{2}y + 6\right) + 9y = 12$

$\frac{30}{2}y + 60 + 9y = 12$

$15y + 60 + 9y = 12$

$24y = 12 - 60$

$24y = -48$

$y = -2$

③

Now sub  $y = -2$  into

$x = \frac{3}{2}y + 6$

$x = \frac{3}{2}(-2) + 6$

$x = \frac{-6}{2} + 6$

$x = -3 + 6$

$x = 3$



$$9) \quad 2x + 2y = -4$$

$$-12x + 4y = -24$$

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

$$4(-3x + y = -6)$$

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

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

$$\textcircled{2} \quad -3x + y = -6$$

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

$$x + y = -2$$

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

$$\boxed{x = -y - 2}$$

sub into  $\textcircled{2}$

$$-3x + y = -6$$

$$-3(-y - 2) + y = -6$$

$$3y + 6 + y = -6$$

$$4y + 6 = -6$$

$$4y = -12$$

$$\boxed{y = -3}$$

Sub  $y = -3$  into

$$x = -y - 2$$

$$x = -(-3) - 2$$

$$x = 3 - 2$$

$$\boxed{x = 1}$$



$$\textcircled{1} r + n = 186$$

$$\textcircled{2} n - r = 94$$

$$\textcircled{1} r + n = 186$$

$$r = 186 - n$$

$$\textcircled{2} n - r = 94$$

$$n - (186 - n) = 94$$

$$n - 186 + n = 94$$

$$2n - 186 = 94$$

$$2n = 94 + 186$$

$$2n = 280$$

$$n = 140$$

$$\textcircled{3} r = 186 - n$$

$$r = 186 - (140)$$

$$r = 46$$

$$\textcircled{1} r + n = 186$$

$$\textcircled{2} r + 94 = n$$

Sub  $\textcircled{2}$  into  $\textcircled{1}$

$$r + n = 186$$

$$r + (r + 94) = 186$$

$$2r + 94 = 186$$

$$2r = 92$$

$$r = 46$$

↓ sub  $\textcircled{2}$

11) ①  $2l + 2w = 540$   
②  $l - w = 90$

②  $l - w = 90$

$l = 90 + w$

①  $2l + 2w = 540$

$2(90 + w) + 2w = 540$

$180 + 2w + 2w = 540$

$180 + 4w = 540$

$4w = 540 - 180$

$4w = 360$

$w = 90$

$l = 90 + w$

$l = 90 + 90$

$l = 180$

①  $l = 90 + w$   
②  $540 = 2l + 2w$

$$19) \textcircled{1} \frac{1}{2}x + \frac{2}{3}y = 1$$

$$6\left(\frac{1}{2}x + \frac{2}{3}y = 1\right)$$

$$\frac{6}{2}x + \frac{12}{3}y = 6$$

$$\textcircled{1} \boxed{3x + 4y = 6}$$

$$3x = -4y + 6$$

$$\boxed{x = \frac{-4y}{3} + 2}$$

Now sub into new equation #2

$$3x - 4y = 30$$

$$3\left(\frac{-4}{3}y + 2\right) - 4y = 30$$

$$-12\frac{y}{3} + 6 - 4y = 30$$

$$-4y + 6 - 4y = 30$$

$$-8y + 6 = 30$$

$$-8y = 30 - 6$$

$$-8y = 24$$

$$\boxed{y = -3}$$

$$\textcircled{2} \frac{1}{4}x - \frac{1}{3}y = \frac{5}{2}$$

$$12\left(\frac{1}{4}x - \frac{1}{3}y = \frac{5}{2}\right)$$

$$\frac{12x}{4} - \frac{12}{3}y = \frac{60}{2}$$

$$\textcircled{2} \boxed{3x - 4y = 30}$$

These are now the new equations.

Now sub  $y = -3$  into

$$x = \frac{-4}{3}y + 2$$

$$x = \frac{-4}{3}(-3) + 2$$

$$x = \frac{12}{3} + 2$$

$$x = 4 + 2$$

$$\boxed{x = 6}$$

2) Substitution Method

Steps:

i) Choose one equation and isolate one variable; this equation will be considered the first equation. (easiest one to get  $x=$  or  $y=$  from either eqn 1 or eqn 2)

ii) Substitute the solution from step 1 into the second equation and solve for the variable in the equation.

iii) Using the value found in step 2, substitute it into the first equation and solve for the second variable.

iv) Substitute the values for both variables into both equations to show they are correct.

Example: Solve the system by Substitution Method

$$\textcircled{1} \quad 3x + 5y = 8$$

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

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

see next page  
for the work out and description

Sub into  $\textcircled{1}$

$$3(3 - 2y) + 5y = 8$$

$$9 - 6y + 5y = 8$$

$$9 - y = 8 - 9$$

$$-y = -1$$

$$y = +1$$

sub  $\textcircled{3}$

$$x = 3 - 2y$$

$$= 3 - 2(+1)$$

$$= 3 - 2$$

$$x = 1$$

$(1, 1)$

Use Substitution to Find the Point of Intersection

$$1) \boxed{x} - 4y = 6 \rightarrow$$

$$\boxed{x = 6 + 4y}$$

$$2) 7x + 6y = 8$$

↓ sub into ②

$$7(6 + 4y) + 6y = 8$$

$$42 + 28y + 6y = 8$$

$$42 + 34y = 8$$

isolate

$$\cancel{42} + 34y = 8 - \cancel{42}$$

$$\frac{34y}{34} = \frac{-34}{34}$$

$$\boxed{y = -1}$$

↓ sub into ③

$$x = 6 + 4(y)$$

$$6 + 4(-1)$$

$$= 6 + (-4)$$

$$\boxed{x = 2}$$

$$x, y$$

$$(2, -1)$$



Worksheet



# 2, 4

# 5, 6, 7

All questions

just page 1 to Print

$$4) \quad 5x - 2y = -6 \quad y = mx + b$$

$$\frac{-2y}{-2} = \frac{-5x - 6}{-2}$$

$$y = \frac{5}{2}x + 3$$

$$m = \frac{5}{2} \quad b = 3$$

or

$$-\frac{5}{2}$$

$$5x - 2y = -8$$

$$\frac{-2y}{-2} = \frac{-5x - 8}{-2}$$

$$y = \frac{5}{2}x + 4$$

$m = \frac{5}{2} \quad b = 4$   
parallel  
won't  
intersect

Chapter 7 System of Equations Day 3 Review Worksheet.pdf