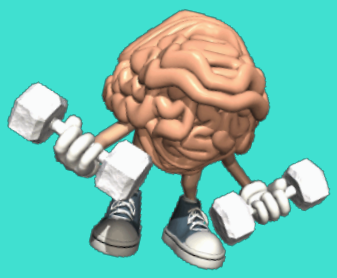
Warm Up



1) Solve the following systems using Substitution :

a) $3x - 4y = 19$
$x + 4y = 1$

b) $3x + y = 3$
$x = y - 1$

this is the warm up

a) ② $3x - 4y = 19$

① $x + 4y = 1$ $-4y$ $-4y$

③ $\Rightarrow x = 1 - 4y$

⇓ sub into ②

$3x - 4y = 19$

$3(1-4y) - 4y = 19$

$3 - 12y - 4y = 19$

$3 - 16y = 19$

$-3 \quad -3$

$-16y = 19 - 3$

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

$y = -1$

⇓ sub into ③

$x = 1 - 4y$

$= 1 - 4(-1)$

$= 1 + 4$

$x = 5$

Point of intersection

$(5, -1)$

this is the warm up

b) $3x + y = 3$

① $x = y - 1$ ⇒ Sub into ②

$3x + y = 3$

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

$3y - 3 + y = 3$

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

$\frac{4y}{4} = \frac{6}{4}$

$y = \frac{6}{4}$

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

⇓ Sub into ①

$x = y - 1$

$x = \frac{3}{2} - 1$ (Need common denom)

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

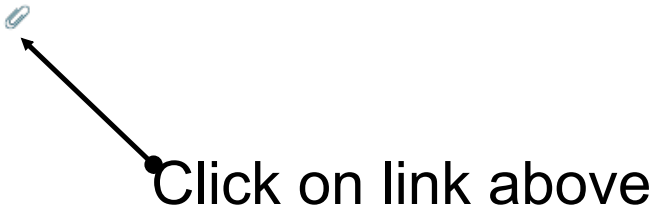
$x = \frac{1}{2}$

Point of intersection

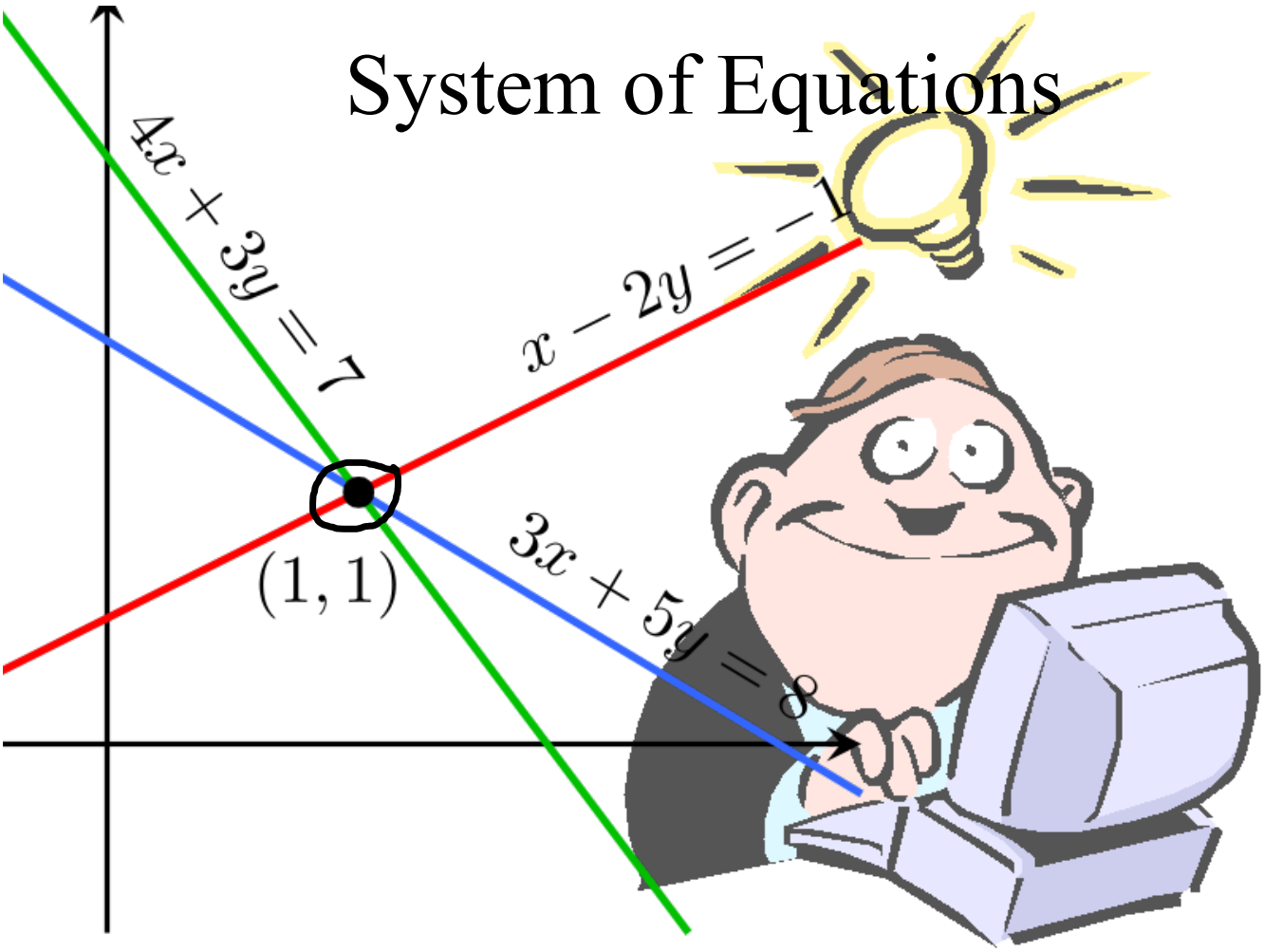
(x, y)

$(\frac{1}{2}, \frac{3}{2})$

HW Solutions to WS



System of Equations



You try

Elimination using Addition

Consider the system

similar

① $1x - 2y = 5$

② $+\ 2x + 2y = 7$

①+②

$3x = 12$

Add two eq together when terms are opposites

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

$x = 4$

Sub into ①

① $x - 2y = 5$

$4 - 2y = 5$

$4 - 4 - 2y = 5 - 4$

$-2y = 1$

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

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

Point of intersection $(4, \frac{-1}{2})$

Elimination using Addition

Consider the system

$$x - 2y = 5$$
$$+\ 2x + 2y = 7$$

touch

Lets add both equations to each other

Solution

Elimination using Addition

Consider the system

$$\begin{array}{rl} x - 2y = 5 & \leftarrow \\ +\ 2x + 2y = 7 & \leftarrow \\ \hline 3x \quad = 12 & \end{array}$$

Lets add both equations to each other

solve for x

ANS: (4, y)

$x = 4$

Now solve for y (HOW???)

- sub the value of x into one of the equations and solve for y

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

intersection point (4, - 0.5)

Elimination using Addition

Same process as before
You can choose to eliminate either x or y

① x + 3y = 14
② -x + 4y = 7

Who would you eliminate??

Do you add or subtract?

$\frac{7y}{7} = \frac{21}{7}$

$y = 3$

Sub into ①

① $x + 3y = 14$
$x + 3(3) = 14$
$x + 9 = 14$
$x + 9 - 9 = 14 - 9$
$x = 5$

Point of intersection
(5, 3)

Solution

Elimination using Addition

$$\begin{array}{r} x + 3y = 14 \\ -x + 4y = 7 \\ \hline 7y = 21 \end{array}$$

Add this time

$y = 3$

$(x, 3)$

solve for x

$x + 3y = 14$

$x + 3(3) = 14$

$x + 9 = 14$

$x = 14 - 9$

$x = 5$

You Try

Solve the system of equations

Example 1)

$$2x + y = 5$$
$$3x - y = 15$$

$5x = 20$

$\frac{5x}{5} = \frac{20}{5}$

$x = 4$

⇓ sub into ①

① $2x + y = 5$

$2(4) + y = 5$

$8 + y = 5$

$-8 \quad -8$

$y = -3$

$(4, -3)$

Example 2)

opp

① $6y + x = 11$

② $2y - x = 5$

① + ②

$8y = 16$

$\frac{8y}{8} = \frac{16}{8}$

$y = 2$

⇓ sub into ①

① $6y + x = 11$

$6(2) + x = 11$

$12 + x = 11$

$-12 \quad -12$

$x = -1$

$(-1, 2)$

Elimination Using Subtraction

exact same

opp

① $6x + 11y = -5$ → $6x+11y=-5$

② $6x + 9y = -3$ → $-6x-9y=+3$

Careful you are subtraction all of the second (switch all signs on the second equation)

① - ② → $2y = -2$

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

$y = -1$

sub into ①

$6x + 11y = -5$

$6x + 11(-1) = -5$

$6x - 11 = -5$

$6x - 11 \overset{+11}{} = -5 + 11$

$\frac{6x}{6} = \frac{6}{6}$

$x = 1$

May want to change signs and add

Point of intersection

$(1, -1)$

Same

Elimination Using Subtraction

Careful you are subtraction all of the second
(switch all signs on t second equation)

$$6x + 11y = -5$$
$$-(6x + 9y = -3)$$

Solution

Elimination Using Subtraction

Careful you are subtraction all of the second
(switch all signs on t second equation)

$$6x + 11y = -5$$
$$-6x - 9y = +3$$
$$2y = -2$$

$$y = -1$$

solve for x

$$6x + 11y = -5$$
$$6x + 11(-1) = -5$$
$$6x - 11 = -5$$
$$6x = -5 + 11$$
$$6x = 6$$
$$x = 1$$

Intersection (1, -1)

You Try

Use subtraction to eliminate

a) $7x + 7y = 0$

$7x - y = 24$

① - ②

$7x+7y=0$

$\Rightarrow -7x+y=-24$

$8y=-24$

$\frac{8y}{8} = \frac{-24}{8}$

$y=-3$

⇓ sub into ①

$7x+7y=0$

$7x+7(-3)=0$

$7x-21=0$

$7x-21+21=0+21$

$7x=21$

$\frac{7x}{7} = \frac{21}{7}$

$x=3$

$(3,-3)$

b) $7x + 6y = -10$

$9x + 6y = -30$

Math 10 (Numbers Relations & Functions) Name_____

Elimination

Date_____

Solve each system by elimination.

1) $2x + 8y = 8$
$-3x - 8y = -4$

2) $-x + 4y = 7$
$x + 4y = 25$

3) $-9x + 8y = 15$
$-9x + 6y = 27$

4) $-x - 5y = -3$
$-x + 3y = 13$

5) $-5x + 2y = 9$
$6x - 2y = -8$

6) $5x + 5y = 30$
$5x + 2y = 12$

7) $-10x + 8y = -28$
$9x + 4y = 14$

8) $-6x + y = -15$
$-12x - 3y = -15$

9) $-5x + 10y = -10$
$-7x - 5y = -14$

10) $-5x + 10y = 5$
$10x - 4y = 6$

11) $7x - 2y = 24$
$3x + 9y = 30$

12) $-3x - 2y = 2$
$-5x - 3y = 6$

13) $3x - 6y = 30$
$-10x - 9y = -13$

14) $7x - 10y = 0$
$-9x - 4y = 0$

15) $-10x + 7y = 12$
$-3x + 6y = -12$

16) $-3x + 4y = 2$
$-5x + 3y = 29$

17) $-10x - 6y = -14$
$8x + 5y = 11$

18) $-3x - 2y = 8$
$-8x - 7y = 18$

1) $2x + 8y = 8$
$-3x - 8y = -4$
$(-4, 2)$

2) $-x + 4y = 7$
$x + 4y = 25$
$(9, 4)$

3) $-9x + 8y = 15$
$-9x + 6y = 27$
$(-7, -6)$

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

5) $-5x + 2y = 9$
$6x - 2y = -8$
$(1, 7)$

6) $5x + 5y = 30$
$5x + 2y = 12$
$(0, 6)$

7) $-10x + 8y = -28$
$9x + 4y = 14$
$(2, -1)$

8) $-6x + y = -15$
$-12x - 3y = -15$
$(2, -3)$

9) $-5x + 10y = -10$
$-7x - 5y = -14$
$(2, 0)$

10) $-5x + 10y = 5$
$10x - 4y = 6$
$(1, 1)$

11) $7x - 2y = 24$
$3x + 9y = 30$
$(4, 2)$

12) $-3x - 2y = 2$
$-5x - 3y = 6$
$(-6, 8)$

13) $3x - 6y = 30$
$-10x - 9y = -13$
$(4, -3)$

14) $7x - 10y = 0$
$-9x - 4y = 0$
$(0, 0)$

15) $-10x + 7y = 12$
$-3x + 6y = -12$
$(-4, -4)$

16) $-3x + 4y = 2$
$-5x + 3y = 29$
$(-10, -7)$

17) $-10x - 6y = -14$
$8x + 5y = 11$
$(2, -1)$

18) $-3x - 2y = 8$
$-8x - 7y = 18$
$(-4, 2)$

Homework:

Math 10B Name_____

System of Equations: Elimination (Add & Sub)

Date_____

Solve each system by elimination.

1) $8x - 8y = 0$
$-5x + 8y = -3$

2) $6x - 4y = 6$
$-8x + 4y = 0$

3) $-3x + 8y = -15$
$9x - 8y = -3$

4) $x + 3y = 18$
$3x - 3y = -6$

5) $-x + 5y = -28$
$x + 3y = -28$

6) $-5x + 3y = 10$
$5x - 5y = 10$

7) $-4x + 5y = 25$
$-4x + 6y = 22$

8) $-3x + 5y = 12$
$-5x + 5y = 0$

11) $5x - y = 19$
$-9x - y = -9$

12) $-2x + y = 0$
$-6x + y = 20$

13) $10x = 18 + 8y$
$-8y = -5x - 27$

14) $8y + 13 = 3x$
$-8y = 9x + 25$

15) $4 + x = -2y$
$16 + 8y - x = 0$

16) $-12 + 8x = 6y$
$-5y - 10 = 4x$

Homework:

Math 10B Name_____

System of Equations: Elimination (Add & Sub) Date_____

Solve each system by elimination.

1) $8x - 8y = 0$
$-5x + 8y = -3$
(-3, -6) add

2) $6x - 4y = 6$
$-8x + 4y = 0$

3) $-3x + 8y = -15$
$9x - 8y = -3$
(3, 5) add

4) $x + 3y = 18$
$3x - 3y = -6$

5) $-x + 5y = -28$
$x + 3y = -28$
(-8, -10) add

6) $-5x + 3y = 10$
$5x - 5y = 10$

7) $-4x + 5y = 25$
$-4x + 6y = 22$
(6, 6) sub

8) $-3x + 5y = 12$
$-5x + 5y = 0$

9) $-4x - 7y = -15$
$-4x - 9y = -17$
(-5, 6) sub

10) $-5x - 3y = 7$
$-2x - 3y = -8$

11) $5x - y = 19$
$-9x - y = -9$
(-5, -10) sub

12) $-2x + y = 0$
$-6x + y = 20$

13) $10x = 18 + 8y$
$-8y = -5x - 27$
(-1, -2) sub

14) $8y + 13 = 3x$
$-8y = 9x + 25$

15) ~~$4 + x = -2y$~~
$16 - 8y - x = 0$
(0, -2)

16) ~~$-12 + 8x = 6y$~~
$-5y - 10 = 4x$

2) $6x - 4y = 6$ ①

\+ $-8x + 4y = 0$ ②

$-2x + 0 = 6$

$-2x = 6$

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

$x = -3$

$6x - 4y = 6$

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

$-18 - 4y = 6$

$-4y = 6 + 18$

$-4y = 24$

$y = \frac{24}{-4}$

$y = -6$

2) $6x - 4y = 6$ ①

\+ $-8x + 4y = 0$ ②

$-2x + 0 = 6$

$-2x = 6$

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

$x = -3$

$6x - 4y = 6$

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

$-18 - 4y = 6$

$-4y = 6 + 18$

$-4y = 24$

$y = \frac{24}{-4}$

$y = -6$

8) $-3x + 5y = 12$ ①

$-(-5x + 5y = 0)$ ②

$(-3x + +5x) + 0 = 12 - 0$

$2x = 12$

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

$\boxed{x = 6}$

$-3x + 5y = 12$

$-3(6) + 5y = 12$

$-18 + 5y = 12$

$5y = 12 + 18$

$5y = 30$

$\boxed{y = 6}$

$$8)\ -3x+5y=12$$
$$-\ (-5x+5y=0)$$

8) $-3x+5y=12$
$+\ \ 5x-5y=0$
$2x = 12$

$\boxed{x=6}$

10) $-5x - 3y = 7$

$-(-2x - 3y = -8)$

$(-5x + 2x) - 3y + 3y = 7 + 8$

$-3x = 15$

$x = \frac{15}{-3}$

$\boxed{x = -5}$

$-5x - 3y = 7$

$-5(-5) - 3y = 7$

$25 - 3y = 7$

$-3y = 7 - 25$

$-3y = -18$

$y = \frac{-18}{-3}$

$\boxed{y = +6}$

Elimination using Multiplication

Consider the system

$x + 2y = 6$

$3x + 3y = -6$

How are they related?

What could we do to equation 1 to make the "x" equal?

answer

Elimination using Multiplication

Consider the system

$x + 2y = 6$

$3x + 3y = -6$

How are they related?

What could we do to equation 1 to make the "x" equal?

multiply equation 1 by 3

Elimination using Multiplication

Consider the system

$3x + 6y = 18$

$3x + 3y = -6$

Now subtract the equations

Elimination using Multiplication

Consider the system

$$3x + 6y = 18$$
$$-3x - 3y = +6$$

Now subtract the equations

Answer

Elimination using Multiplication

Consider the system

$$3x + 6y = 18$$
$$-3x - 3y = +6$$

Now subtract the equations

$$3y = 24$$

$$y = 8$$

Sub into equation 1 (original) or the above

$$x + 2y = 6$$
$$x + 2(8) = 6$$
$$x + 16 = 6$$
$$x = 6 - 16$$
$$x = -10$$

$$(-10, 6)$$

You Try

ANS:

1)

$x + 2y = 5$

$2x + 6y = 12$

2)

$$x + 2y = 4$$

$$x - 4y = 16$$

ANS: 

solutions to Day 3 WS PDF Version.pdf