Warm Up...

Solve the following systems of equations:

$y = 2x - 3$ ①
$-4x + 3y = -1$ ②
$(4, 5)$???

Sub ① into ②
$-4x + 3(2x - 3) = -1$
$-4x + 6x - 9 = -1$
$2x = -1 + 9$
$2x = 8$
$x = 4$ ... ③
Sub ③ into ①
$y = 2(4) - 3$
$= 8 - 3$
$= 5$
$(4, 5)$

$3x + 4y = 15$ ①
$y = 6x - 3$ ②
$(1, 3)$???

Sub ② into ①
$3x + 4(6x - 3) = 15$
$3x + 24x - 12 = 15$
$27x = 27$
$x = 1$ .... ③
sub ③ into ②
$y = 6(1) - 3$
$= 6 - 3$
$= 3$
$(1, 3)$

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

① $x = 5y - 7$ ... ③
Sub ③ into ②
$5(5y - 7) + 2y = -8$
$25y - 35 + 2y = -8$
$27y = -8 + 35$
$27y = 27$
$y = 1$ .... ④
Sub ④ into ③
$x = 5(1) - 7$
$= 5 - 7$
$= -2$
$(-2, 1)$

Solving Systems of Equations Using Elimination Method

Objective is to **"ELIMINATE"** one of the variables by either adding or subtracting the two equations.

EXAMPLE #1:

$-4x + 3y = -4$ ①

$4x - y = 12$ ②

$2y = 8$

$y = 4$ ... ③

Sub ③ into ②

$4x - 4 = 12$

$4x = 16$

$x = 4$ (4, 4)

STEPS...

1) Put equations in the Standard Form.

Ax + By = C

NOTE: Number the equations!!!

2) **Multiply equation(s) to get a common coefficient for either x or y terms.**

3) Add OR Subtract equations to ELIMINATE the terms.

4) SOLVE remaining equation for unknown

5) Back substitute to get other unknown

EXAMPLE #2:

$$-2x + 6y = -18 \quad (1)$$

$$+ \quad 4x - 6y = 12 \quad (2)$$

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

$x = -3 \ldots . (3)$

Sub (3) into (1)

$-2(-3) + 6y = -18$

$6 + 6y = -18$

$\frac{6y}{6} = \frac{-24}{6}$

$y = -4$

$(-3, -4)$

EXAMPLE #3 - Coefficients are the same sign...

$$3x - y = -11 \quad (1)$$
$$-\ 3x - 5y = -7 \quad (2)$$

$4y = -4$

$y = -1 \quad \ldots (3)$

Sub (3) into (1)

$3x + 1 = -11$

$3x = -12$

$x = -4$

$(-4, -1)$

EXAMPLE #4: What if none of the coefficients are the same???

$x + 12y = 9$ ①

$-2x - 6y = 0$ ②

① x 2 $2x + 24y = 18$ .... ③

$-2x - 6y = 0$ ②

$18y = 18$

$y = 1$ ... ④

Sub ④ into ①

$x + 12(1) = 9$

$x = 9 - 12$

$= -3$

$(-3, 1)$

Example #5 - Getting a common coefficient

$$2x + 4y = -8 \quad (1)$$
$$-5x + 3y = 7 \quad (2)$$

(1) x 5 $\quad 10x + 20y = -40 \quad (3)$

(2) x 2 $\quad -10x + 6y = 14 \quad (4)$

(3) + (4)
$$26y = -26$$
$$y = -1 \quad \ldots \quad (5)$$

Sub (5) into (1)
$$2x + 4(-1) = -8$$
$$2x - 4 = -8$$
$$2x = -4$$
$$x = -2$$
$$(-2, -1)$$

PRACTICE PROBLEMS...

Worksheet - Solve by Elimination.pdf

Do #1 - 12

Solutions...

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Solving Systems of Equations by Elimination

Date_____ Period____

Solve each system by elimination.

1) $-4x - 2y = -12$
$4x + 8y = -24$
(6, –6)

2) $4x + 8y = 20$
$-4x + 2y = -30$
(7, –1)

3) $x - y = 11$
$2x + y = 19$
(10, –1)

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

5) $-2x - 9y = -25$
$-4x - 9y = -23$
(–1, 3)

6) $8x + y = -16$
$-3x + y = -5$
(–1, –8)

7) $-6x + 6y = 6$
$-6x + 3y = -12$
(5, 6)

8) $7x + 2y = 24$
$8x + 2y = 30$
(6, –9)

9) $5x + y = 9$
$10x - 7y = -18$
(1, 4)

10) $-4x + 9y = 9$
$x - 3y = -6$
(9, 5)

11) $-3x + 7y = -16$
$-9x + 5y = 16$
(–4, –4)

12) $-7x + y = -19$
$-2x + 3y = -19$
(2, –5)

13) $16x - 10y = 10$
$-8x - 6y = 6$

(0, –1)

14) $8x + 14y = 4$
$-6x - 7y = -10$

(4, –2)

15) $-4x - 15y = -17$
$-x + 5y = -13$

(8, –1)

16) $-x - 7y = 14$
$-4x - 14y = 28$

(0, –2)

17) $-7x - 8y = 9$
$-4x + 9y = -22$

(1, –2)

18) $5x + 4y = -30$
$3x - 9y = -18$

(–6, 0)

19) $-4x - 2y = 14$
$-10x + 7y = -25$

(–1, –5)

20) $3x - 2y = 2$
$5x - 5y = 10$

(–2, –4)

21) $5x + 4y = -14$
$3x + 6y = 6$

(–6, 4)

22) $2x + 8y = 6$
$-5x - 20y = -15$

Infinite number of solutions

23) $-14 = -20y - 7x$
$10y + 4 = 2x$

(2, 0)

24) $3 + 2x - y = 0$
$-3 - 7y = 10x$

(–1, 1)

Attachments

Worksheet - Solve by Elimination.pdf