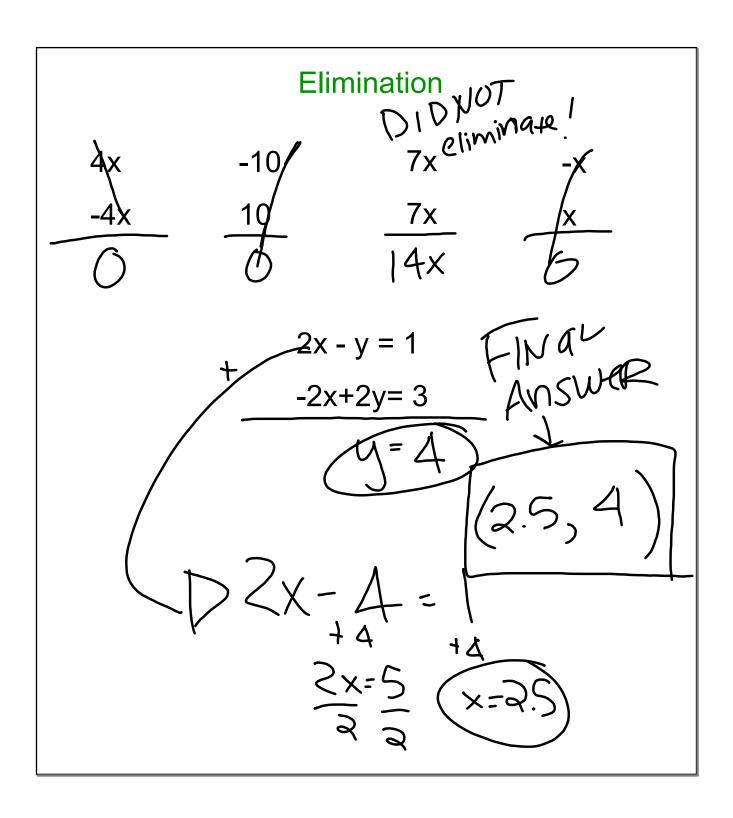# 2-3 Elimination

Objectives:

I can solve a system by elimination and determine the number of solutions

I can verify a solution

Vocabulary

Elimination: get Rid of something

Solution: oNe ORdeRed paiR (x, y)

*Infinitely many solutions: thing eliminate, get tRue STaTeMeNT

*No solution: things eliminate, $4 = 4$
get false statement

$$0 = 7$$

Elimination

DID NOT eliminate!

4x
-4x
―――
0

-10
10
―――
0

7x
7x
―――
14x

-x
x
―――
0

2x - y = 1
-2x + 2y = 3
――――――――
$y = 4$

FINAL ANSWER

(2.5, 4)

▷ 2x - 4 = 1
   +4
$\frac{2x}{2} = \frac{5}{2}$
   +4
x = 2.5

Solve the following systems by elimination (verify)

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

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

$$y = -1$$

$$-4x + 3(-1) = -3$$

$$-4x - 3 = -3$$
$$+3 \qquad +3$$

$$\frac{-4x}{-4} = \frac{0}{-4}$$

$$\boxed{(0,-1)}$$

$$x = 0$$

$$y - 2x = 1$$
$$-1(y + x = 4)$$
$$-y - x = -4$$

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

$$x = 1$$

$$\boxed{(1,3)}$$

$$y - 2(1) = 1$$

$$y - 2 = 1$$
$$+2 \quad +2$$

$$y = 3$$

Solve the following systems by elimination

$$5x + 6y = -8$$
$$(2x + 3y = -5) \quad -2$$

$$-4x - 6y = 10$$

$$x = 2$$

$$5(2) + 6y = -8$$
$$10 + 6y = -8$$
$$\underline{\quad -10 \quad\quad -10}$$
$$\frac{6y}{6} = \frac{-18}{6}$$
$$y = -3$$

$$(2, -3)$$

$$4x - 4 = 8$$
$$-8x + y = 19$$

$$8x - 8y = 16$$

$$\frac{-7y}{-7} = \frac{35}{-7}$$

$$y = -3$$

$$y = -5$$

$$-8x + (-5) = 19$$
$$\quad\quad\quad +5 \quad +5$$
$$-8x = 24$$
$$x = -3$$

$$8x - 8(-5) = 16$$
$$8x + 40 = 16$$
$$\underline{\quad -40 \quad\quad -40}$$
$$8x = -24$$
$$x = -3$$

$$(-3, -5)$$

Solve the following systems by elimination

$5x - 4y = -11$

$-5x + 5y = 15$

$(3, 1)$

$* 3x + 2y = 11$

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

$-3x - 15y = -24$

$-13y = -13$

$y = 1$

$3x + 2(1) = 11$

$3x + 2 = 11$

$-2 \quad -2$

$3x = 9$

$x = 3$

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Example: A buffet has one price for adults and another price for children. The Taylor family has 2 adults and 3 children and their bill was $40.50. The Wong family has 3 adults and 1 child and their bill was $38. What is the price for adults and children at the buffet?

$a = adult \$$

$c = child \$$

Taylor: $2a + 3c = \$40.50$

Wong: $(3a + 1c = 38) \cdot -3$

$-9a - 3c = -114$

$2(10.5) + 3c = 40.5$ $\dfrac{-7a}{-7} = \dfrac{-73.5}{-7}$

$21 + 3c = 40.5$
$-21 \qquad -21$ $a = 10.5$

$\dfrac{3c}{3} = \dfrac{19.5}{3}$ $c = 6.50$

adult meal costs $10.50
child meal costs $6.50