

#16 Systems by Elimination

Add Equations together so that a variable cancels out

$$\begin{array}{r} \text{Ex)} \quad 4x + 8y = 20 \\ + \quad -4x + 2y = -30 \\ \hline \end{array}$$

$$0x + \frac{10y}{10} = \frac{-10}{10}$$

$$y = -1$$

Plug in y to find x

$$4x + 8y = 20$$

$$4x + 8(-1) = 20$$

$$4x - 8 = 20$$

$$+8 \quad +8$$

$$\frac{4x}{4} = \frac{28}{4}$$

$$x = 7$$

Elimination is best when both equations are given in $Ax + By = C$ Standard Form for line

$$(7, -1)$$

$$\begin{array}{r} \text{Ex2)} \quad x - y = 11 \\ + \quad 2x + y = 19 \\ \hline \end{array}$$

$$\frac{3x}{3} = \frac{30}{3}$$

$$x = 10$$

$$x - y = 11$$

$$10 - y = 11$$

$$-10 \quad -10$$

$$-y = 1$$

$$y = -1$$

$$(10, -1)$$

$$\begin{array}{r} \text{Ex3)} \quad -4x + 9y = 9 \\ +4(x - 3y = -6) \\ \hline 4x - 12y = -24 \end{array}$$

add top + Bottom equations

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

$$y = 5$$

$$(9, 5)$$

$$x = 9$$

$$x - 3y = -6$$

$$x - 3(5) = -6$$

$$x - 15 = -6$$

$$+15 \quad +15$$

Ex4 $(-7x + y = -19) \cdot (-3)$
 $-2x + 3y = -19$
 $+ 2x - 3y = 57$ → add together

$19x = 38$
 $x = 2$

$(2, -5)$

→ $-7x + y = -19$
 $-7(2) + y = -19$

$-14 + y = -19$
 $+14 \quad +14$
 $y = -5$

Ex5 $-4x - 2y = -12$
 $+ 4x + 8y = -24$

$6y = -36$
 $y = -6$

$(6, -6)$

→ $-4x - 2y = -12$
 $-4x - 2(-6) = -12$
 $-4x + 12 = -12$
 $-4x = -24$
 $x = 6$

→ $4x + 8y = -24$
 $4x + 8(-6) = -24$
 $4x - 48 = -24$
 $4x = 24$
 $x = 6$

Ex6 $8x + 14y = 4$

$2(-6x - 7y = -10)$ → add $-12x - 14y = -20$
 $-4x = -16$
 $x = 4$

$(4, -2)$

$8x + 14y = 4$
 $8(4) + 14y = 4$
 $32 + 14y = 4$
 $-32 \quad -32$
 $14y = -28$
 $y = -2$