

## Elimination or Linear Combination

- 1) All variables on same side
- 2)
  - a) get a variable with the same #
  - b) that variable has different signs
  - c) Add two equations and solve
- 3) Substitute answer from <sup>step</sup> 2 back into one of the equations.

$$\begin{array}{r} 5x + y = 6 \\ + -5x + 3y = -22 \\ \hline \end{array}$$

$$\frac{4y}{4} = \frac{-16}{4}$$

$$y = -4$$

$$(2, -4)$$

$$5x + (-4) = 6$$

$$\begin{array}{r} 5x - 4 = 6 \\ +4 +4 \end{array}$$

$$\frac{5x}{5} = \frac{10}{5}$$

$$x = 2$$

$$4x + y = -5$$

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

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$$\frac{-2y}{-2} = \frac{-14}{-2}$$

$$y = 7$$

$$4x + (7) = -5$$

$$4x + 7 = -5$$

$$-7 \quad -7$$

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$$\frac{4x}{4} = \frac{-12}{4}$$

$$x = -3$$

$$(-3, 7)$$

$$3x - 4y = 12 \times 2 \rightarrow 6x - 8y = 24$$

$$6x + 2y = -11 \rightarrow -6x + 2y = +11$$

$$6x + 2\left(-\frac{7}{2}\right) = -11$$

$$\begin{array}{r} 6x - 7 = -11 \\ +7 \quad +7 \end{array}$$

$$\frac{6x}{6} = \frac{-4}{6}$$

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

$$\frac{-10y = 35}{-10 \quad -10}$$

$$y = -\frac{7}{2}$$

$$\left(-\frac{2}{3}, -\frac{7}{2}\right)$$

$$\begin{array}{l} 5x - 2y = -15 \quad \times 5 \Rightarrow 25x - 10y = -75 \\ 7x + 5y = 18 \quad \times 2 \Rightarrow 14x + 10y = 36 \end{array}$$

$$\begin{array}{r} 25x - 10y = -75 \\ 14x + 10y = 36 \\ \hline 39x \qquad = -39 \\ \hline 39 \qquad \qquad 39 \end{array}$$

$$5(-1) - 2y = -15$$

$$\begin{array}{r} -5 - 2y = -15 \\ +5 \qquad +5 \end{array}$$

$$\begin{array}{r} -2y = -10 \\ \hline \cdot 2 \qquad \cdot 2 \end{array}$$

$$y = 5$$

$$x = -1$$

$$(-1, 5)$$

Elimination Method  
(way 3)

$$\left(-\frac{11}{2}, -6\right)$$

$$2x - 4y = 13 \xrightarrow{\times 2} 4x - 8y = 26$$

$$4x - 5y = 8 \rightarrow -4x + 5y = -8$$

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$$\begin{array}{r} -3y = 18 \\ -3 \quad -3 \end{array}$$

$$y = -6$$

$$3) \quad 2x - 4(-6) = 13$$

$$2x + 24 = 13$$

$$\begin{array}{r} -24 \quad -24 \\ \hline \end{array}$$

$$\frac{2x}{2} = -\frac{11}{2}$$

$$x = -\frac{11}{2}$$

$$\begin{array}{r} -3x + 2y = -6 \\ 5x - 2y = 18 \end{array}$$

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$$\frac{2x}{2} = \frac{12}{2}$$
$$x = 6$$

$$\begin{array}{r} -3(6) + 2y = -6 \\ -18 + 2y = -6 \\ +18 \qquad \qquad +18 \end{array}$$

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$$\frac{2y}{2} = \frac{12}{2}$$
$$y = 6$$

$$(6, 6)$$

$$5x - 2y = 12 \quad \times 8 = 40x - 16y = 96$$

$$-9x - 8y = 19 \quad \times 2 = +18x + 16y = 38$$

$$\frac{58x}{58} = \frac{58}{58}$$

$$x = 1$$

$$5(i) - 2y = 12$$

$$\begin{array}{r} 5 - 2y = 12 \\ -5 \quad -5 \end{array}$$

$$\frac{-2y = 7}{-2 \quad -2}$$

$$y = -\frac{7}{2}$$

$$5x - 2y = 12 \quad \times 9 = 45x - 18y = 108$$

$$-9x - 8y = 19 \quad \times 5 = -45x - 40y = 95$$

$$\frac{-58y = 203}{-58 \quad -58}$$

$$5x - 2\left(-\frac{7}{2}\right) = 12$$

$$\begin{array}{r} 5x + 7 = 12 \\ -7 \quad -7 \end{array}$$

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

$$x = 1$$

$$y = -\frac{7}{2}$$

HW pg 152 # 23-28 all