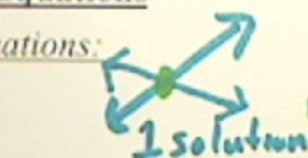
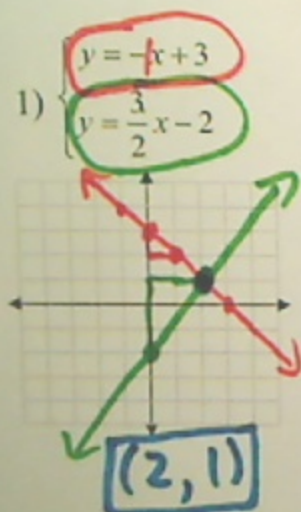
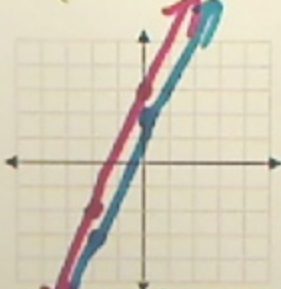


3.1 Graphing Systems of Equations

Solution to a System of Equations:



2)
$$\begin{cases} 2y = 5x + 6 \\ -10x + 4y = 8 \end{cases}$$

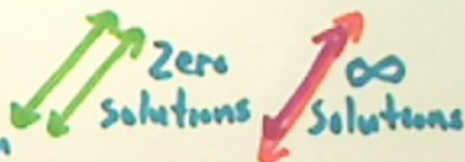


$$\frac{2y}{2} = \frac{5x}{2} + \frac{6}{2} \quad y = \frac{5}{2}x + 3$$

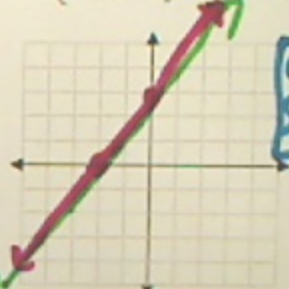
$$\begin{aligned} -10x + 4y &= 8 \\ +10x & \quad +10x \end{aligned}$$

$$\frac{4y}{4} = \frac{10x}{4} + \frac{8}{4} \quad y = \frac{5}{2}x + 2$$

No Solution



3)
$$\begin{cases} 2y - 3x - 6 = 0 \\ -6x + 4y - 12 = 0 \end{cases}$$



$$\frac{2y}{2} - \frac{3x}{2} - \frac{6}{2} = 0 \quad y = \frac{3}{2}x + 3$$

$$\frac{2y}{2} - \frac{3x}{2} - \frac{6}{2} = 0 \quad y = \frac{3}{2}x + 3$$

$$\begin{aligned} -6x + 4y - 12 &= 0 \\ +6x & \quad +12 \end{aligned}$$

$$\frac{4y}{4} = \frac{6x}{4} + \frac{12}{4} \quad y = \frac{3}{2}x + 3$$

∞ Solutions

3.2 Solving Systems Algebraically

Substitution Method:

$$1) \begin{cases} y = x - 2 \\ 2x - y = 5 \end{cases} \quad \boxed{(3, 1)}$$

$$2x - (x - 2) = 5$$

$$2x - x + 2 = 5$$

$$x + 2 = 5$$

$$x = 3$$

$$y = x - 2$$

$$y = (3) - 2$$

$$y = 3 - 2$$

$$y = 1$$

$$2) \begin{cases} 2m - n = 1 \\ 10m - 5n = 8 \end{cases}$$

$$10m - 5(2m - 1) = 8$$

$$10m - 10m + 5 = 8$$

$$5 = 8$$

False

No Solution

$$\begin{array}{r} 2m - n = 1 \\ -2m \quad -2m \\ \hline \end{array}$$

$$-n = -2m + 1$$

$$\frac{-n}{-1} = \frac{-2m + 1}{-1}$$

$$n = 2m - 1$$

Elimination Method:

$$3) \begin{cases} -2x - 3y = -6 \\ 2y + 5x = 14 \end{cases}$$

$$2x = 8 \quad (x=4)$$

$$\frac{2}{2} \quad \frac{2}{2}$$

$$2^{\text{nd}} \quad 2y + 5(4) = 14$$

$$2y + 20 = 14$$

$$-20 \quad -20$$

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

$$y = -3$$

$$\boxed{\begin{matrix} (4, -3) \\ x \quad y \end{matrix}}$$

$$4) \begin{cases} 2x + 4y = 10 \\ 5y + 3x = 11 \end{cases} \cdot 2$$

$$(4y + 2x = 10) \cdot 3$$

$$10y + 6x = 22$$

$$-12y - 6x = -30$$

$$\frac{-2y}{-2} = \frac{-8}{-2}$$

$$y = 4$$

$$1^{\text{st}} \quad 2x + 4(4) = 10$$

$$2x + 16 = 10$$

$$-16 \quad -16$$

$$\frac{2x}{2} = \frac{-6}{2} \quad (x = -3)$$

$$\boxed{(-3, 4)}$$

$$5) \begin{cases} 2x - 3y - 2 = 0 \\ 6y - 4x = -4 \end{cases}$$

$$(-3y + 2x = 2) \cdot 2$$

$$-6y + 4x = 4$$

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

$$0 = 0$$

True

$$\infty \text{ solutions}$$

System Word Problems:

6) Joe is making \$10 an hour and he owes \$80. Kim is spending \$5 an hour and has \$145 saved. When will they have the same amount of money and how much will they have?

$$\text{Joe } y = 10x - 80$$

$$\text{Kim } y = -5x + 145$$

$$\begin{array}{r} 10x - 80 = -5x + 145 \\ +5x + 80 \quad +5x + 80 \\ \hline 15x = 225 \end{array}$$

$$\frac{15x}{15} = \frac{225}{15} \quad 15 \overline{) 225} \\ \underline{-15} \\ 75$$

$$x = 15 \text{ hrs}$$

$$1^{\text{st}} \quad y = 10(15) - 80$$

$$y = 150 - 80$$

$$y = 70$$

7) You sell 100 items and made \$250. CDs \$2 and DVDs \$4. How many CDs and DVDs did you sell?

$$c = \# \text{ CDs} \quad d = \# \text{ DVDs}$$

$$-2(c + d = 100)$$

$$2c + 4d = 250$$

$$-2c - 2d = -200$$

$$\frac{2d}{2} = \frac{50}{2} \quad \boxed{d = 25}$$

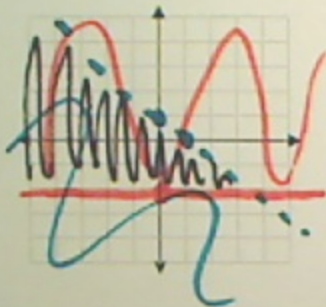
$$c + (25) = 100$$

$$-25 \quad -25$$

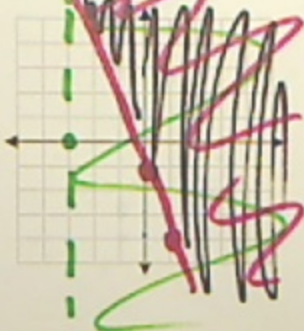
$$c = 75$$

3.3 Systems of Inequalities

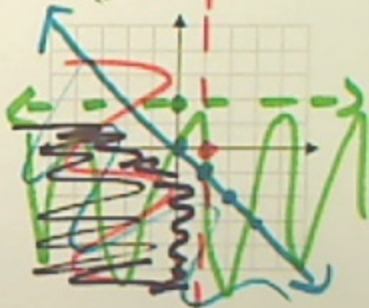
$$1) \begin{cases} y < 1 - x \\ y \geq -2 \end{cases}$$



$$2) \begin{cases} x > -3 \\ -3x - y \leq 1 \end{cases}$$



$$3) \begin{cases} x < 1 \\ y \leq -x + 0 \\ y < 2 \end{cases}$$



4) Which points are solutions?

- a) (-2, 4) NO b) (3, 1) NO c) (4, -3)

$$\begin{array}{r} -3x - y \leq 1 \\ +3x \qquad +3x \\ \hline \end{array}$$

$$-y \leq \frac{3x}{-1} + \frac{1}{-1}$$

$$y \geq -3x - 1$$



3.6 Systems with Three Variables

$$1) \begin{cases} 5x - y + z = 4 & \text{1st} \\ x + 2y - z = 5 & \text{2nd} \\ 2x + 3y - 3z = 5 & \text{3rd} \end{cases} (x, y, z)$$

$$\begin{array}{l} \text{1st } 5x - y + z = 4 \\ \text{2nd } x + 2y - z = 5 \end{array}$$

$$\begin{array}{l} \text{2nd } (x + 2y - z = 5)(-3) \\ \text{2nd } -3x - 6y + 3z = -15 \\ \text{3rd } 2x + 3y - 3z = 5 \end{array}$$

$$\text{4th } 6x + y = 9$$

$$\text{5th } -1x - 3y = -10$$

$$\text{4th } (6x + y = 9)(3)$$

$$\text{4th } 6(1) + y = 9$$

$$\text{4th } 18x + 3y = 27$$

$$\begin{array}{r} 6 + y = 9 \\ -6 \quad -6 \end{array} \quad \boxed{y = 3}$$

$$\text{5th } -1x - 3y = -10$$

$$\text{1st } 5(1) - (3) + z = 4$$

$$\frac{17x}{17} = \frac{17}{17}$$

$$\boxed{x = 1}$$

$$5 - 3 + z = 4$$

$$2 + z = 4$$

$$\begin{array}{r} -2 \quad -2 \\ z = 2 \end{array}$$

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

$$2) \begin{cases} 4x - 2y + 5z = 6 \\ 3x + 3y + 8z = 4 \\ x - 5y - 3z = 5 \end{cases} \quad (_ , _ , _)$$

$$\begin{array}{l} 3^{\text{rd}} - 4(x - 5y - 3z = 5) \\ 1^{\text{st}} \quad 4x - 2y + 5z = 6 \\ 3^{\text{rd}} \quad -4x + 20y + 12z = -20 \end{array}$$

$$4^{\text{th}} - 1(18y + 17z = -14)$$

$$4^{\text{th}} \quad -18y - 17z = 14$$

$$5^{\text{th}} \quad 18y + 17z = -11$$

$$0 = 3$$

False

No Solution

$$3^{\text{rd}} \quad -3x + 15y + 9z = -15$$

$$2^{\text{nd}} \quad 3x + 3y + 8z = 4$$

$$5^{\text{th}} \quad 18y + 17z = -11$$