

MTH 166 Homework #5 Key

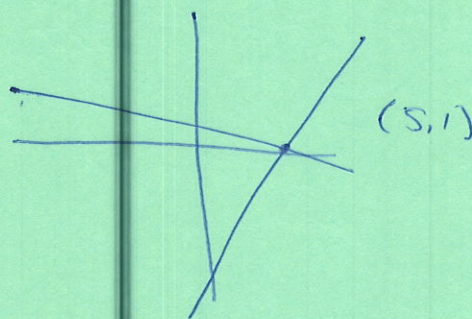
a. $\begin{cases} x + 3y = 8 \\ y = 2x - 9 \end{cases} \rightarrow \frac{-x+8}{3} = y$

$$x + 3(2x - 9) = 8$$

$$x + 6x - 27 = 8$$

$$7x = 35$$

$$x = 5 \rightarrow y = 2(5) - 9 = 1 \quad (5, 1)$$



Consistent
independent

$\begin{cases} x + 3y = 8 \quad \times 2 \\ -2x + y = -9 \end{cases} \rightarrow \begin{array}{r} 2x + 6y = 16 \\ -2x + y = -9 \\ \hline 7y = 7 \end{array}$

$$\frac{7y}{7} = \frac{7}{7} \rightarrow y = 1$$

$$\begin{aligned} x + 3(1) &= 8 \\ x &= 5 \\ (5, 1) \end{aligned}$$

b. $\begin{cases} 2x + 5y = -4 \\ x - 3y = 0 \end{cases} \rightarrow \frac{-2x-4}{5} = y$
 $\frac{1}{3}x = y$

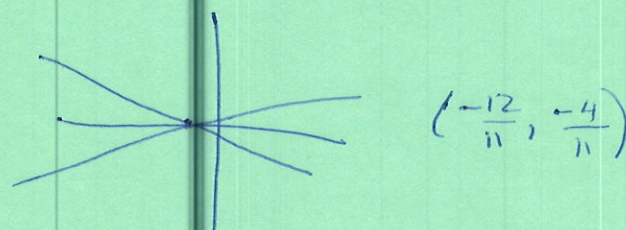
$$x = 3y$$

$$2(3y) + 5y = -4$$

$$6y + 5y = -4$$

$$11y = -4$$

$$y = -\frac{4}{11}$$



$$x = 3\left(-\frac{4}{11}\right) = -\frac{12}{11} \quad \left(-\frac{12}{11}, -\frac{4}{11}\right)$$

Consistent
independent

$$\begin{array}{r} 2x + 5y = -4 \\ -2x + 6y = 0 \\ \hline 11y = -4 \end{array}$$

$$11y = -4$$

$$y = -\frac{4}{11}$$

$$x - 3\left(-\frac{4}{11}\right) = 0$$

$$x + \frac{12}{11} = 0$$

$$x = -\frac{12}{11}$$

$$\left(-\frac{12}{11}, -\frac{4}{11}\right)$$

$$1c. \begin{cases} y = 3x - 5 \\ 21x - 35 = 7y \rightarrow y = 3x - 5 \end{cases}$$

$$21x - 35 = 7(3x - 5)$$

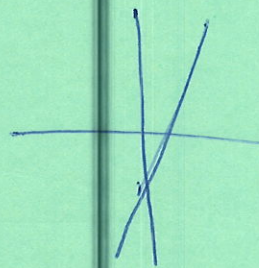
$$21x - 35 = 21x - 35 \text{ all reals}$$

$$y = 3x - 5 \rightarrow -3x + y = -5 \quad \times (-7)$$

$$21x - 35 = 7y \rightarrow 21x - 7y = 35$$

$$\underline{-21x + 7y = -35}$$

$$0 = 0$$



Consistent
dependent

$$d. \begin{cases} \frac{x}{6} - \frac{y}{2} = \frac{1}{3} & *6 \\ \frac{x}{4} - \frac{y}{4} = -1 & *4 \end{cases} \rightarrow$$

$$\begin{cases} x - 3y = 2 & \rightarrow y = \frac{-x+2}{-3} \\ x - y = -4 & y = x+4 \end{cases}$$

$$\begin{array}{r} x - 3y = 2 \\ -x + y = +4 \\ \hline \end{array}$$

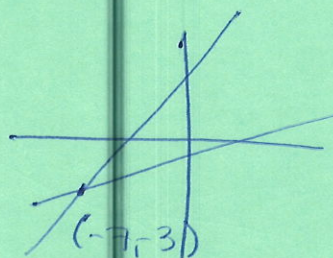
$$-2y = 6$$

$$y = -3$$

$$x - 3(-3) = 2$$

$$x + 9 = 2$$

$$x = -7$$



Consistent
independent

$$x - 3y = 2$$

$$x - y = -4 \rightarrow x = y - 4$$

$$y - 4 - 3y = 2$$

$$-2y - 4 = 2$$

$$-2y = 6$$

$$y = -3$$

$$x = -3 - 4 = -7$$

$(-7, 3)$

$(-7, 3)$