

3.2a Solve by Substitution

* Lion King - Circle of Life

$$\begin{cases} 2x + 5y = -5 \\ x + 3y = 3 \end{cases} \quad \left. \begin{array}{l} \text{Solve one equation for} \\ x \text{ or } y \text{ \& plug into the} \\ \text{other one.} \end{array} \right\}$$

1st - write side by side

$$\begin{array}{r} 2x + 5y = -5 \\ x + 3y = 3 \\ \underline{-3y \quad -3y} \\ 2(3-3y) + 5y = -5 \end{array}$$

2nd - Solve for a variable (coefficient of 1)

$$x = 3 - 3y$$

3rd - Plug it in other equation (Circle of Life)

$$\begin{array}{r} 6 - 6y + 5y = -5 \\ 6 - 1y = -5 \\ \underline{-6 \quad -6} \\ -1y = -11 \\ \underline{-1 \quad -1} \\ y = 11 \end{array}$$

4th - Complete the circle

$$\begin{array}{l} x = 3 - 3(11) \\ x = 3 - 33 \\ x = -30 \end{array}$$

$$(-30, 11)$$

Solve

$$3x + y = 16$$

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

$$\begin{array}{r} 3x + y = 16 \\ -3x \quad -3x \end{array}$$

$$y = 16 - 3x$$

$$\begin{array}{r} y = 16 - 3(4) \\ 16 - 12 \end{array}$$

$$y = 4$$

$$(4, 4)$$

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

$$2x - 3(16 - 3x) = -4$$

$$2x - 48 + 9x = -4$$

$$11x - 48 = -4$$

$$11x = 44$$

$$x = 4$$

P164: Substitution

$$3) \begin{cases} 2x + 5y = 7 \\ x + 4y = 2 \end{cases}$$

$$7) \begin{cases} 3x - y = 2 \\ 6x + 3y = 14 \end{cases}$$

$$9) \begin{cases} 3x + 2y = 6 \\ x - 4y = -12 \end{cases}$$

$$11) \begin{cases} 3x + y = -1 \\ 2x + 3y = 18 \end{cases}$$

$$5) \begin{cases} 6x - 2y = 5 \\ -3x + y = 7 \end{cases}$$

$$10) \begin{cases} 6x - 3y = 15 \\ -2x + y = -5 \end{cases}$$