

Which equation would you solve first and for which variable?

a) $2x + y = 10$ *
 $-4x + 6y = 24$

b) $2x + 10y = 20$
 $x - 3y = 30$ *

c) $-x + y = 6$ *
 $4x + 2y = 18$

d) $9x + 10y = 90$
 $* 4x + 2y = 8$
 smaller #'s ?

1) At the school musical, student tickets cost \$5 and adult tickets cost \$7. In the spring, the school sold a total of 195 tickets for a total of \$1135.

a) Define your variables. $x = \text{\# of student tickets}$ $y = \text{\# of adult tickets}$

b) Write and solve a linear system to represent the situation.

Total \$: $5x + 7y = 1135 \rightarrow 5x + 7(-x + 195) = 1135$
 $5x - 7x + 1365 = 1135$
 $-2x + 1365 = 1135$
 $-1365 - 1365$
 $-2x = -230$
 $-2 -2$
 $x = 115$

Total # tickets: $x + y = 195$
 $-x$ $-x$
 $y = -x + 195$
 $y = -115 + 195$
 $y = 80$

(115, 80)
 x y

c) Using words, explain your solution in the context of the situation.
 They sold 115 student tickets & 80 adult tickets.

$$2) \quad \begin{array}{l} 2x = 8 \\ x + y = 2 \end{array} \rightarrow \frac{2x}{2} = \frac{8}{2}$$

$$x = 4$$

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

$$(4, -2)$$

$$4) \quad \begin{array}{l} x - y = 0 \\ 12x - 5y = -21 \end{array}$$

$$3) \quad \begin{array}{l} x + y = 4 \\ 4x + y = 1 \end{array} \rightarrow \frac{x + y}{-x} = \frac{4}{-1}$$

$$y = -x + 4$$

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

$$\begin{array}{r} 3x + 4 = 1 \\ -4 \quad -4 \\ \hline 3x = -3 \end{array}$$

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

$$(-1, 5)$$

$$x = -1 \rightarrow y = -(-1) + 4 = 1 + 4 = 5$$

$$5) \quad \begin{array}{l} 5x + 3y = -23 \\ x + 2y = 1 \end{array}$$

$$6) \quad \begin{array}{l} -6x + 3y = 18 \\ y = 2x + 6 \end{array}$$

$$-6x + 3(2x + 6) = 18$$

$$\begin{array}{r} -6x + 6x + 18 = 18 \\ 18 = 18 \\ \text{true} \end{array}$$

Infinitely Many Solutions

$$(3, 2)$$

$$7) \quad \begin{array}{l} -2x + 6y = 6 \\ -7x + 8y = -5 \end{array}$$

$$\begin{array}{r} -2x + 6y = 6 \\ -6y - 6y \\ \hline -2x = -6y + 6 \\ \frac{-2x}{-2} = \frac{-6y + 6}{-2} \end{array}$$

$$* \quad x = 3y - 3$$

$$-7(3y - 3) + 8y = -5$$

$$-21y + 21 + 8y = -5$$

$$\begin{array}{r} -13y + 21 = -5 \\ -21 \quad -21 \\ \hline -13y = -26 \end{array}$$

$$\frac{-13y}{-13} = \frac{-26}{-13}$$

$$y = 2$$

$$\begin{array}{r} -2x + 6(2) = 6 \\ -2x + 12 = 6 \\ -12 \quad -12 \\ \hline -2x = -6 \\ \frac{-2x}{-2} = \frac{-6}{-2} \\ x = 3 \end{array}$$