

Savin' on Cruisin'

The Bici Bicycle Company is planning to make a low price ultra-light bicycle. There are two different plans being considered for building this bicycle. The first plan includes a cost of \$125,000 to design and build a prototype bicycle. The materials and labor costs for each bike made under the first plan will be \$225. The second plan includes a cost of \$100,000 to design and build the prototype. The materials and labor costs for each bike made under the second plan will be \$275.

You recently got a job at Bici Bicycle Company as a financial analyst. You have been asked to analyze the costs for each proposed bicycle prototype and determine which plan Bici should follow. Use any method to determine your response.

let $x = \#$ bikes

$y = \text{cost}$

since both = y
Set = to
each other

plan 1 - $y = 225x + 125,000$

plan 2 - $y = 275x + 100,000$

$$\begin{array}{r} 225x + 125,000 = 275x + 100,000 \\ - 225x \qquad \qquad \qquad - 225x \\ \hline \end{array}$$

$$\begin{array}{r} 125,000 = 50x + 100,000 \\ - 100,000 \qquad \qquad \qquad - 100,000 \\ \hline \end{array}$$

$$\frac{25,000}{50} = \frac{50x}{50}$$

$$500 = x$$

The break even ~~was~~ number of bicycles is 500. For less than 500 bicycles Plan B is better. For more than 500 bicycles Plan A is better

Solve the following by method of your choice.

1. $y = 3x$
 $y - x = 18$

$$3x - x = 18 \quad y = 3x$$

$$2x = 18 \quad y = 3(9)$$

$$x = 9 \quad y = 27$$

$$(9, 27)$$

2. $y = 2x - 4$
 $x = y - 5$

$$y = 2(y - 5) - 4 \quad x = y - 5$$

$$y = 2y - 10 - 4 \quad x = 14 - 5$$

$$\begin{array}{r} y = 2y - 10 - 4 \\ - 2y - 2y \\ \hline \end{array} \quad x = 9$$

$$-y = -14$$

$$y = 14$$

$$(9, 14)$$

$$3. \begin{cases} x + 2y = 7 \\ 3x - 2y = -3 \end{cases}$$

$$\begin{array}{r} 4x = 4 \\ x = 1 \end{array}$$

$$(1, 3)$$

$$\begin{array}{r} x + 2y = 7 \\ 1 + 2y = 7 \\ \hline -1 \quad -1 \\ \hline 2y = 6 \\ y = 3 \end{array}$$

$$4. \begin{cases} 3x + y = 9 \\ x + y = 7 \end{cases}$$

$$\begin{array}{r} 3x + y = 9 \\ - (x + y = 7) \\ \hline 2x = 2 \\ x = 1 \end{array}$$

$$(1, 6)$$

$$\begin{array}{r} x + y = 7 \\ 1 + y = 7 \\ \hline -1 \quad -1 \\ \hline y = 6 \end{array}$$

5. Mrs. Black bought 2 pounds of potatoes and 3 pounds of turnips, for which she paid \$20.00. Mr. Cook, paying the same price per pound, paid \$11.25 for 1 pound of potatoes and 2 pounds of turnips. Find the price of a pound of potatoes, and the price of a pound of turnips.

$x = \text{potatoes}$
 $y = \text{turnips}$.

$$\begin{array}{r} 2x + 3y = 20 \\ -2(x + 2y = 11.25) \end{array}$$

$$\begin{array}{r} 2x + 3y = 20 \\ -2x - 4y = -22.50 \\ \hline -y = -2.50 \\ y = 2.50 \end{array}$$

$$\begin{array}{r} x + 2y = 11.25 \\ x + 2(2.5) = 11.25 \\ x + 5 = 11.25 \\ \hline -5 \quad -5 \\ \hline x = 6.25 \end{array}$$

\$6.25 for a pound of potatoes $\hat{=}$ \$2.50 for a pound of turnips