

2. You have recently begun researching phone billing plans. Phone Company A charges a flat rate of \$75 a month. A flat rate means that your bill will be \$75 each month with no additional costs. The billing plan for Phone Company B is a linear function of the number of texts that you send that month. That is, the total cost of the bill changes each month depending on how many texts you send. The table below represents the inputs and the corresponding outputs that the function assigns.

Phone A
 $y = 75$

Phone B
 $y = 0.1x + 45$

Input x (number of texts)	Output y (cost of bill)
50	\$50
150	\$60
200	\$65
500	\$95

Let $x = \# \text{ of texts per month}$
 $y = \text{total cost}$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{60 - 50}{150 - 50} = \frac{10}{100} = 0.1$$

$$= \frac{65 - 60}{200 - 150} = \frac{5}{50} = 0.1$$

$$= \frac{95 - 65}{500 - 200} = \frac{30}{300} = 0.1$$

At what number of texts would the bill from each phone plan be the same? At what number of texts is Phone Company A the better choice? At what number of texts is Phone Company B the better choice?

$$\begin{cases} y = 75 \\ y = 0.1x + 45 \end{cases}$$

$$75 = 0.1x + 45$$

$$\begin{array}{r} 75 \\ -45 \\ \hline 30 \\ 0.1 \overline{) 30} \\ \underline{0.1x} \\ 30 \\ \underline{0.1x} \\ 0 \end{array}$$

$x = 300$ texts
Same price

$$y = 0.1x + b$$

$$(50) = 0.1(50) + b$$

$$\begin{array}{r} 50 \\ -5 \\ \hline 45 \end{array} = b$$