

M10 - 9.6 - Let Statement/Value of Notes

A person has 24 quarters and dimes.

let $q = \# \text{ of quarters}$
let $d = \# \text{ of Dimes}$

Let Statements

$$q + d = 24$$

Equation

A person has some Toonies. How much do they have in Toonies?

let $t = \# \text{ toonies}$

Round the bottom of your t!

t	Value \$	Calculation
0	0	$0 \times 2 = 0$
1	2	$1 \times 2 = 2$
2	4	$2 \times 2 = 4$
t	$2t$	$t \times 2 = 2t$

of \times Value

$$2t$$

Value of a Toonie \times # Toonies

A person has the \$2.30 in Dimes, How many Dimes do they have?

let $d = \# \text{ of Dimes}$

d	Value \$	Calculation
0	0	$0 \times 0.1 = 0$
1	0.1	$1 \times 0.1 = 0.1$
2	0.2	$2 \times 0.1 = 0.2$
d	$0.1d$	$d \times 0.1 = 0.1d$

$$0.1d$$

$$0.1d = 2.30$$

$$\frac{0.1d}{0.1} = \frac{2.30}{0.1}$$

$$d = 23$$

They have 23 Dimes

$$0.1 \times 23 = 2.30$$

Check Answer

An airplane is flying at a height of 400 m and descending at 5 m/s.

let $h = \text{height (m)}$
let $t = \text{time (s)}$

$$h = 400 - 5t$$

Jane's hair is 30 cm long and grows at 2 cm per month.

let $h = \text{hair length (cm)}$
let $t = \text{time (months)}$

$$h = 20 + 2m$$

M10 - 9.6 - $Ax + By = C$ Coins/Mixture Notes

Jay has 12 Total Coins of Quarters and Dimes worth \$2.40. How many does he have of each?

Let $d = \# \text{ dimes}$
Let $q = \# \text{ quarters}$

$$d + q = 12$$

$$0.1d + 0.25q = 2.40$$

2 equations

$$-q \quad -q$$

$$d = 12 - q$$

Isolate

$$0.1(d) + 0.25q = 2.40$$

Substitute

$$0.1(12 - q) + 0.25q = 2.40$$

Distribute

$$1.2 - 0.1q + 0.25q = 2.40$$

Combine Like Terms

$$1.2 + 0.15q = 2.40$$

Subtract Both Sides

$$-1.2 \quad -1.2$$

$$\frac{0.15q}{0.15} = \frac{1.20}{0.15}$$

Divide Both Sides

$$d = 12 - q$$

$$d = 12 - (8)$$

$$q = 8$$

Solve

Substitute

$$d = 4$$

Solve

$$4 + 8 = 12 \quad \checkmark$$

$$0.1 \times 4 + 0.25 \times 8 = 2.40 \quad \checkmark$$

Check your answer

Jay has 4 dimes and 8 quarters worth \$2.40.

Answer the question

As scientist wants to make 50 L of a 40% acid solution. They mixed together a 30% acid solution with the 70% acid solution. How many litres of each solution must the scientist mix?

let $a = \text{litres of 30\% mix}$
let $b = \text{litres of 70\% mix}$

$$\% \times \text{Amount} + \% \times \text{Amount} = \% \times \text{Amount}$$

$$a + b = 50$$

$$b = 50 - a$$

$$0.3a + 0.7b = 0.4(50)$$

$$0.3a + 0.7(50 - b) = 20$$

...

$$b = 12.5$$

...

$$a = 37.5$$

12.5 L of 70% Mix

37.5 L of 30% Mix

M10 - 9.6 - $y = mx + b$ Cell Phone Word Problems Notes

Create Let Statements, an equation, and solve the equation.

A cell phone company Data Costs \$40 per month plus \$0.1 per Megabyte of Data.

Let $c = \text{cost}$

$$c = 40 + 0.1d$$

Let $d = \text{\# megabytes of data}$

If a person uses 480 megabytes of Data what will month bill cost?

$$d = 480$$

If a person's bill is \$52.60, How many Megabytes did the use?

$$c = 52.60$$

$$c = 40 + 0.1d$$

Formula

$$c = 40 + 0.1d$$

Formula

$$c = 40 + 0.1(480)$$

$$c = 40 + 4.8$$

Substitute

$$52.60 = 40 + 0.1d$$

Substitute

$$\begin{array}{r} -40 \quad -40 \\ 12.60 \quad 0.1d \\ \hline 0.1 = 0.1 \\ 126 = d \end{array}$$

$$c = \$44.80$$

Solve

$$d = 126$$

Solve

480 megabytes of Data will cost \$44.80

\$52.60 will buy 126 megabytes of data

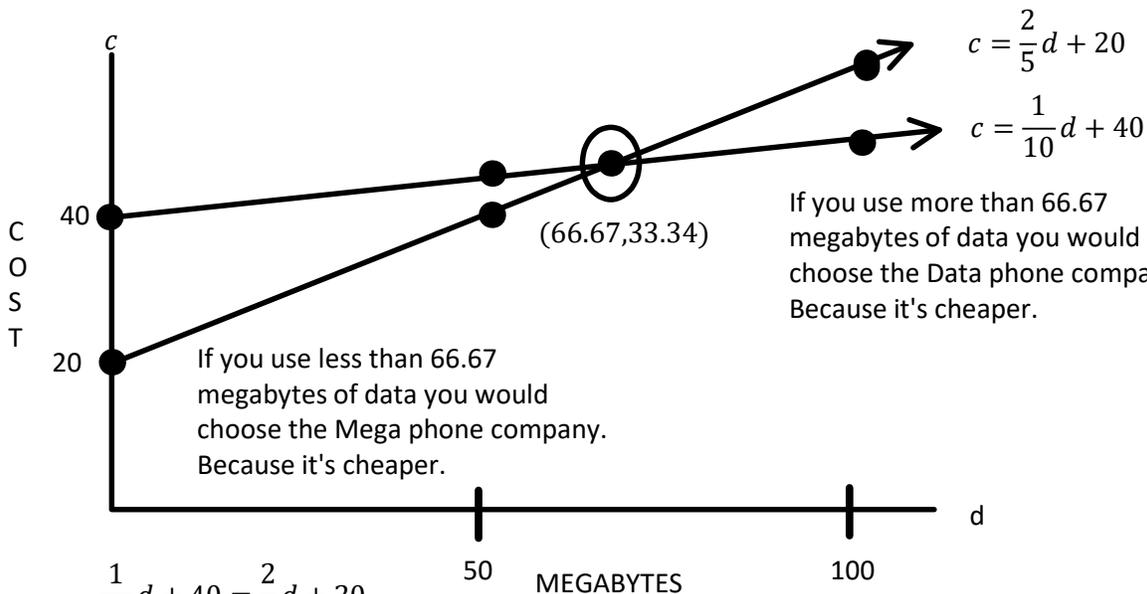
Mega Cell Phone Company charges \$30 per month plus \$0.2 per megabyte of data. Which company would you choose?

Let $c = \text{cost}$

$$c = 20 + 0.4d$$

Let $d = \text{\# megabytes of data}$

$$y = mx + b$$



$$c = \frac{2}{5}d + 20$$

$$c = \frac{1}{10}d + 40$$

If you use more than 66.67 megabytes of data you would choose the Data phone company. Because it's cheaper.

If you use less than 66.67 megabytes of data you would choose the Mega phone company. Because it's cheaper.

$$\begin{aligned} \frac{1}{10}d + 40 &= \frac{2}{5}d + 20 \\ \left(\frac{1}{10}d + 40 = \frac{2}{5}d + 20\right) \times 10 \\ d + 400 &= 4d + 200 \\ \frac{200d}{3} &= \frac{3d}{3} \end{aligned}$$

$$d = 66.67$$

$$c = \frac{1}{5}d + 20$$

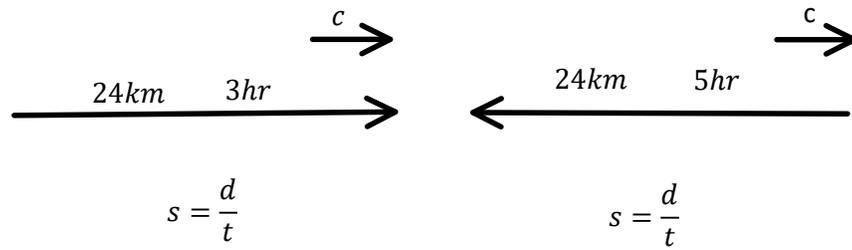
$$c = \frac{1}{5}(66.67) + 20$$

$$c = 33.34$$

M10 - 9.6 - $s = \frac{d}{t}$ Boat/Wind Word Problems Notes

A boat took 3 hours to travel 24 km with the current. On the return trip, the boat took 5 hours to travel 24 km against the current. Determine the speed of the current.

$x = \text{speed of boat}$
 $c = \text{speed of current}$



$$\begin{array}{l}
 \textcircled{1} \quad x + c = \frac{24}{3} \\
 \quad \quad x + c = 8 \\
 \quad \quad x = 8 - c \\
 \quad \quad \downarrow \\
 \textcircled{5} \quad x = 8 - c \\
 \quad \quad x = 8 - 1.6 \\
 \quad \quad x = 6.4
 \end{array}
 \quad \xrightarrow{\textcircled{2}} \quad
 \begin{array}{l}
 (x) - c = \frac{24}{5} \\
 \quad \quad \quad = \frac{24}{5} \\
 (8 - c) - c = \frac{24}{5} \\
 8 - 2c = 4.8 \\
 +2c \quad +2c \\
 8 = 4.8 + 2c \\
 -4.8 \quad -4.8 \\
 3.2 = 2c \\
 \frac{3.2}{2} = \frac{2c}{2} \\
 c = 1.6
 \end{array}
 \quad \xleftarrow{\textcircled{4}} \quad
 \textcircled{3}$$

$x = \text{speed of boat} = 6.4 \frac{\text{km}}{\text{h}}$ $c = \text{speed of current} = 1.6 \frac{\text{km}}{\text{h}}$