

Question one

In 2009 the number of vehicle sales in the United States was 10,602 thousand and in 2013 it was 15,884 thousand.

Solution

- a. [3 pts] Determine the average rate of change (slope) from 2009 to 2013.

$$(15884-10602)/(4-0)$$

$$5282/4$$

$$= \underline{1320.5}$$

- b. [3 pts.] If x is the number of years since 2009 and $f(x)$ is the number of vehicles sold, find the equation of the line through these two points.

Solution

$$\text{Slope} = (15884-10602)/(4-0)$$

$$= 1320.5$$

$$\text{Equation of the line; } f(x)-10602=1320.5(x-0)$$

$$\underline{F(x) = 1320.5x + 10602}$$

- c. [2 pts.] Assuming $f(x)$ is a linear function, use the equation to predict the number of vehicles sold in 2016.

Solution

No of years from 2009 to 2016 = 7 years.

So $n=7$

$$F(x) = 1320.5(7) + 10602$$

$$= \underline{19845.5}$$

Question Two

[8 pts] A scientist mixes water (containing no salt) with a solution that contains 40% salt. She wants to obtain 176 ounces of a mixture that has 5% salt. How many ounces of water (containing no salt) and how many ounces of the 40% salt solution should she use?

Solution

Let W = the volume of water to be mixed in ounces.

Then the volume of 42% salt solution needed is $(176-w)$.

The balance equation for the salt mass is;

$$0.4*(176-w) = 0.05*8.8$$

$$70.4-0.4w=8.8$$

$$70.4-8.8=0.4w$$

$$61.6=0.4w$$

$$W=\underline{154}$$

Therefore, 154 ounces of water is needed and the volume of the 5% salt solution needed is $(176-w)$,

That is $(176-154)$

$$=\underline{22}$$

Question Three

[9 pts] Last year, Singh had \$20,000 to invest. He invested some of it in an account that paid 7% simple interest per year, and he invested the rest in an account that paid 6% simple interest per year. After one year, he received a total of \$1280 in interest. How much did he invest in each account?

Solution

Singh has \$20000

Let X be the invested amount of money which gave 7% per year and Y be the money which gave 6% per year.

So we have total simple interest of \$1280, hence we can say;

$$(X*7*1)/(100) + (Y*6*1)/(100) = 1280$$

OR

$$7x+6y=128000$$

Also we know that $x + y = 20000$ and thus the systems of the equations are;

$$X + Y = 20000 \dots\dots\dots 1$$

$$7X + 6Y = 128000 \dots\dots\dots 2$$

Multiplying by 1 and 7, we have;

$$7x + 7y = 140000 \dots\dots\dots 1$$

$$7x + 6y = 128000 \dots\dots\dots 2$$

When subtract 1 from 2;

We get $Y = \underline{12000}$

So by considering our equation 1, $x + y = 20000$

$$X + 12000 = 20000$$

And thus; $x = \underline{8000}$

So Singh invested \$8000 in 7% per year and \$12000 in 6% per year.