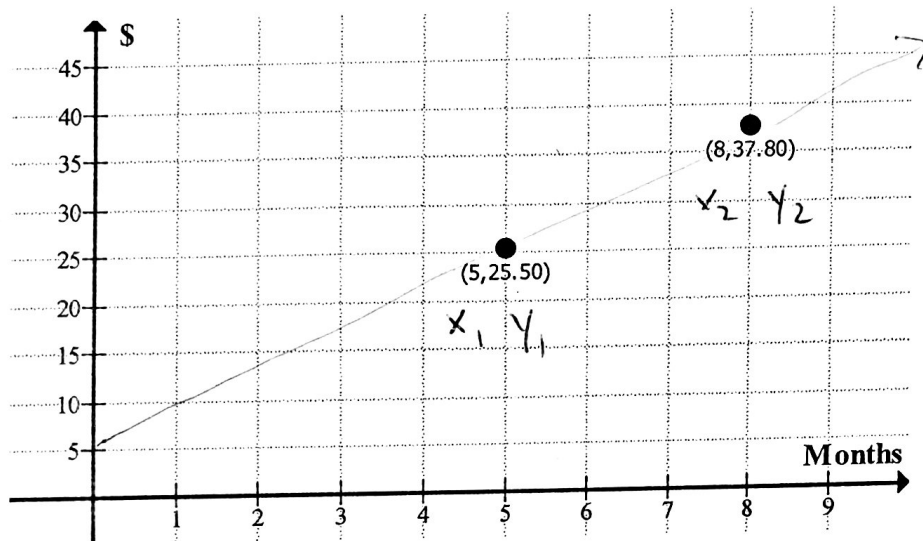


Modelling With Linear Relations | MFM2P

Bryden's granny got him a piggy bank for his birthday (and she gave him a few coins to put in there too). Mr. Smith adds loose change to it every month. 5 months after getting the piggy bank, Bryden has \$25.50 in his piggy bank. 8 months after getting it, Bryden has \$37.80.



a) Use the slope formula to determine the slope between these two points

$$\begin{aligned}
 m &= \frac{y_2 - y_1}{x_2 - x_1} \\
 &= \frac{37.80 - 25.50}{8 - 5} \\
 &= \frac{12.30}{3} \\
 &= \$4.10 \text{ per month.}
 \end{aligned}$$

b) Use algebra to the equation of a line that model this scenario.

$m = 4.1$	$x = 5$	$y = 25.5$
Put in your slope: $y = 4.1x + b$		
Put in your point and solve for "b" $25.5 = 4.1(5) + b$ $25.5 = 20.5 + b$ $-20.5 \quad -20.5$ $5 = b$		
Equation: $y = 4.1x + 5$		

d) How much will Bryden have in his piggy bank 1 year later? (12 months)

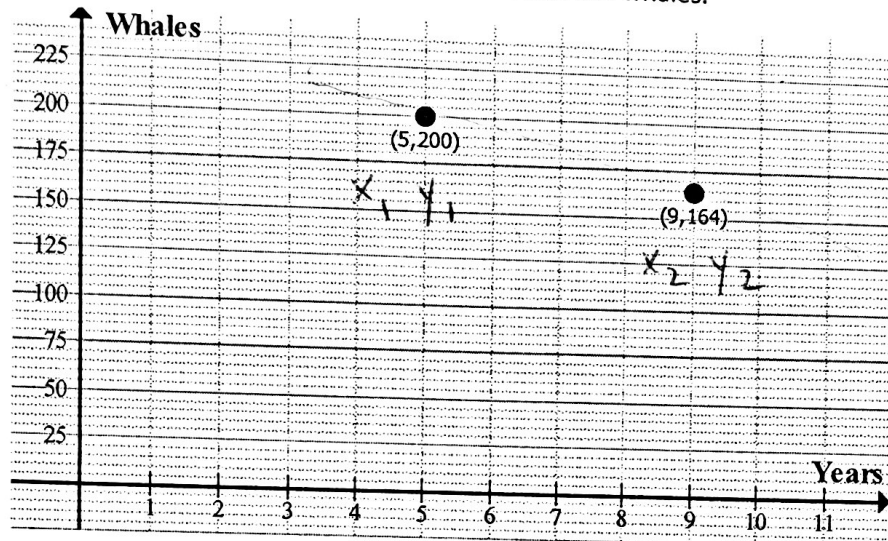
$$\begin{aligned}
 y &= 4.1(12) + 5 \\
 y &= \$54.20 \text{ in 1 year.}
 \end{aligned}$$

e) How much will Bryden have in his piggy bank 5 years later? (5 x 12 = 60 months)

$$\begin{aligned}
 y &= 4.1(60) + 5 \\
 y &= \$251 \text{ in 5 years.}
 \end{aligned}$$

Modelling With Linear Relations | MFM2P

A population of whale off the coast of a BC town has been dying off. 5 years after the start of the decline, there were 200 whales left. 9 years after, there were 164 whales.



a) Use the slope formula to determine the slope between these two points

$$\begin{aligned}
 m &= \frac{y_2 - y_1}{x_2 - x_1} \\
 &= \frac{164 - 200}{9 - 5} \\
 &= \frac{-36}{4} \\
 &= -9
 \end{aligned}$$

b) Use algebra to the equation of a line that model this scenario.

$m = -9$	$x = 9$	$y = 164$
Put in your slope: $y = -9x + b$		
Put in your point and solve for "b" $164 = -9(9) + b$ $164 = -81 + b$ $+81 \quad +81$ $245 = b$		
Equation: $y = -9x + 164$ $y = -9x + 245$		

d) How many whales will there be in 15 years?

$$\begin{aligned}
 y &= -9(15) + 245 \\
 &= -135 + 245 \\
 &= 110 \text{ whales.}
 \end{aligned}$$

e) When will the whales die out?

$$\begin{aligned}
 y &= 0 \\
 0 &= -9x + 245 \\
 9x & \quad +9x \\
 \hline
 9x &= 245 \\
 \frac{9x}{9} &= \frac{245}{9} \\
 x &= 27 \text{ years.}
 \end{aligned}$$