

Exercise 106

A house purchased for \$250,000 is expected to be worth twice its purchase price in 18 years.

- Find a linear function that models the price P of the house versus the number of years t since the original purchase.
- Interpret the slope of the graph of P .
- Find the price of the house 15 years from when it was originally purchased.

Solution

Part (a)

The house price is assumed to be a linear function.

$$P(t) = mt + b$$

Use the facts that the price is \$250,000 initially and \$500,000 in 18 years to determine m and b .

$$P(0) = m(0) + b = 250\,000$$

$$P(18) = m(18) + b = 500\,000$$

Solving this system of equations yields

$$b = 250\,000 \quad \text{and} \quad m = \frac{125\,000}{9} \approx 13\,889.$$

Therefore,

$$P(t) = \frac{125\,000}{9}t + 250\,000.$$

Part (b)

The slope m represents the amount of money the house's price increases every year.

Part (c)

To find the price of the house 15 years from when it was originally purchased, plug $t = 15$ into the formula for $P(t)$.

$$P(15) = \frac{125\,000}{9}(15) + 250\,000 = \frac{1\,375\,000}{3} \approx \$458\,333.33$$