

Question 4

The value of a car decreases exponentially over time according to the function

$$V(t) = 25000e^{-0.18t}$$

where $V(t)$ is the value in dollars and t is the number of years since purchase.

- (a) What is the value of the car after 3 years?
- (b) How long will it take for the car to be worth half its original value?
- (c) After how many years will the car be worth \$5,000?

Question 4 - Solution

Use the exact exponential model and keep full precision until the final rounding.

(a)

$$V(3) = 25000e^{-0.54}$$

$$\boxed{14568.71 \text{ dollars}}$$

(b)

$$e^{-0.18t} = 1/2 \implies t = \ln(2)/0.18$$

$$\boxed{3.85 \text{ years}}$$

(c)

$$25000e^{-0.18t} = 5000 \implies t = \ln(5)/0.18$$

$$\boxed{8.94 \text{ years}}$$