

Question 6

A forest fire is spreading in a circular pattern and the area (in square kilometers) covered by the fire after t hours is modeled by the function:

$$A(t) = 2.5e^{0.4t}$$

- (a) What is the area affected after 6 hours?
- (b) After how many hours will the fire have covered 50 square kilometers?
- (c) How fast is the area growing (in km^2/hr) after 6 hours?

Round all answers to two decimal places.

Question 6 - Solution

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

(a)

$$A(6) = 2.5e^{2.4}$$

$$\boxed{27.56 \text{ km}^2}$$

(b)

$$t = \ln(50/2.5)/0.4$$

$$\boxed{7.49 \text{ hours}}$$

(c)

$$A'(t) = e^{0.4t}, \quad A'(6) = e^{2.4}$$

$$\boxed{11.02 \text{ km}^2/\text{hr}}$$