

4.5 - Exponential and Logarithmic Models

Skill

- Solve problems involving exponential and logarithmic equations

Example

Suppose that the fruit fly population after t days is given by

$$P(t) = \frac{230}{1 + 56.5e^{-0.37t}}$$

What is the population after 5 days?

How long does it take for the population to reach 180?

Example

A hot bowl of soup starts to cool according to Newton's Law of Cooling, so its temperature at time t is given by $T(t) = 65 + 145e^{-0.05t}$

where t is in minutes and temperature is in $^{\circ}\text{F}$.

What is the temperature after 10 minutes?

How long does it take to reach 100°F ?

Example

The magnitude and intensity of earthquakes are related by the equation

$$M = \log(I)$$

The 1906 earthquake in San Francisco had an estimated magnitude of 8.3. In the same year a powerful earthquake occurred on the Colombia-Ecuador border that was four times as intense.

What was the magnitude of the Colombia-Ecuador earthquake?