

7.8 Exponential Models with Differential Equations

Calculus

Name: _____

CA #2

Find the particular solution $y = f(t)$ for each differential equation.

1. $\frac{dy}{dt} = 0.9y$ and $y = 6$ when $x = 0$, then $y =$

2. $\frac{dy}{dx} = -2y$ and $y = 51$ when $x = 0$, then $y =$

3. $\frac{dy}{dt} = 10y$ and $y = -0.7$ when $x = 0$, then $y =$

For each problem, use your understanding of exponential models and differential equations.

4. A population y grows according to the equation $\frac{dy}{dt} = ky$, where k is a constant and t is measured in years. If the population doubles every 19 years, then what is the value of k ?

5. A population y grows according to the equation $\frac{dy}{dt} = ky$, where k is a constant and t is measured in years. If the population doubles every 3 years, then what is the value of k ?

6. During a certain epidemic, the number of people that are infected at any time increases at a rate proportional to the number of people that are infected at that time. If 700 people are infected when the epidemic is first discovered, and 900 people are infected 2 days later, how many people are infected 5 days after the epidemic is first discovered?

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|----------------------|----------------------|----------------------|
| 1. $y = 6e^{0.9t}$ | 2. $y = 51e^{-2t}$ | 3. $y = -0.7e^{10t}$ |
| 4. $k \approx 0.036$ | 5. $k \approx 0.231$ | 6. 1,312 people |

Answers to 7.8 CA #2