Exponential Decay and Growth Test Questions

1. Identify the function as exponential growth or decay. Then find the rate of growth or decay as a percent.
   \[ y = a(1.09)^t \]
   \[ \text{A} \] Exponential growth, 9%
   \[ \text{B} \] Exponential growth, 81%
   \[ \text{C} \] Exponential decay, 9%
   \[ \text{D} \] Exponential decay, 81%

2. Identify the function as exponential growth or decay.
   \[ y = a\left(\frac{8}{5}\right)^t \]
   \[ \text{A} \] Exponential growth
   \[ \text{B} \] Exponential decay

3. The value of a book is $258 and decreases at a rate of 8% per year. Find the value of the book after 11 years.
   \[ \text{A} \] $56.98
   \[ \text{B} \] $159.03
   \[ \text{C} \] $1013.8
   \[ \text{D} \] $103.10

4. Write an exponential growth function to model the situation given below to find the value of the function after the given amount of time.

   Membership of a local club grows at a rate of 7/8% yearly and currently has 30 members. Find the membership after 6 years.
   \[ \text{A} \] 44
   \[ \text{B} \] 47
   \[ \text{C} \] 53
   \[ \text{D} \] 61

5. The graph of which function is shown?

   \[ \text{A} \] \( f(x) = 6^x \)
   \[ \text{B} \] \( f(x) = \left(\frac{1}{3}\right)^x \)
   \[ \text{C} \] \( f(x) = \frac{1}{3} \cdot 6^x \)
   \[ \text{D} \] \( f(x) = 6 \cdot \left(\frac{1}{3}\right)^x \)
The graph of which function is shown?

- A) $y = (0.25)^x$
- B) $y = (0.5)^x$
- C) $y = 0.25 \cdot (0.5)^x$
- D) $y = 4 \cdot (0.5)^x$

In 2004 a person purchased a car for $25,000. The value of the car decreased by 14% annually. Describe and correct the error in writing a function that models the value of the car since 2004. Justify your reasoning.

Error

$$y = a(1 - r)^i$$
$$= 25,000(0.14)^i$$
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Answer Section

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The error is that the decay rate was placed where the decay factor should be. The equation should be:

\[ y = a(1 - r)^t = 25,000(1 - 0.14)^t = 25,000(0.86)^t \]

PTS: 1