05-01 Sample Quiz - Exponential Models

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. The value of a car decreases by 12% each year. What would be the annual decay factor or multiplier?
   a. 12   c. 88
   b. 1.12  d. 0.88

2. Find the multiplier for 11.8% growth.
   a. 11.8  c. 88.2
   b. 1.118  d. 0.882

3. Determine whether the equation could represent exponential growth or decay.
   \[ y = e^{-x} \]
   a. growth   c. neither
   b. decay

4. Determine whether the equation could represent exponential growth or decay.
   \[ y = \frac{1}{3} (2)^x \]
   a. growth   c. neither
   b. decay

5. A culture of bacteria triples by the end of each hour. If there were initially 40 bacteria in a culture, how many bacteria should there be after 3 hours?
   a. 1,728,000 bacteria  c. 120 bacteria
   b. 1080 bacteria  d. 320 bacteria

6. A bicycle depreciates at a rate of 15%. Therese bought a bicycle for $250. How much should it be worth 6 years later?
   a. $225.00  c. $94.29
   b. $250.00  d. $578.27
7. The height of the corn stalk in inches over the first 8 weeks of growth could be roughly modeled by the function

\[ h(t) = 2(1.6^t) \]

where \( t \) is measured in weeks.

On which week of growth would the corn stalk grow to 21 inches?

a. week 1  
b. week 3  
c. week 4  
d. week 5

8. A person was modeling a growing population with a growth factor of 1.5 using pennies. They started with 4 pennies and flipped all 4 pennies. For every penny that landed heads up another penny was added to the pile. Then, the new pile of pennies are all flipped and again for each one landing on heads another penny was added. The process is repeated several more times.

Which of the below would the most reasonable number of pennies to be expected to be in the pile after pennies were added just after the 5th flip?

a. 6 pennies  
b. 14 pennies  
c. 30 pennies  
d. 100 pennies
9. The equation for compound interest is \( A = P \left(1 + \frac{r}{n}\right)^{nt} \) where \( P \) is the initial amount invested, \( r \) is the interest rate as a decimal, \( n \) is the number of times compounded annually, and \( t \) is the number of years.

Determine the value of the account if the initial investment is \( \$8,000 \) compounded monthly at a rate of 6% after 10 years.

a. $8409.12  
   b. $8480.00  
   c. $14,326.78  
   d. $14,555.17

10. Which investment would be worth the most after 20 years?

a. An initial investment of \( \$3000 \) compounded annually at a rate of 12% after 20 years.

b. An initial investment of \( \$3000 \) compounded quarterly at a rate of 11.9% after 20 years.

c. An initial investment of \( \$3000 \) compounded continuously at a rate of 11.8% after 20 years.