1 Which function represents exponential decay?
   1) \( y = 2^{0.3t} \)
   2) \( y = 1.2^{3t} \)
   3) \( y = \left( \frac{1}{2} \right)^{-t} \)
   4) \( y = 5^{-t} \)

2 The function \( M(t) \) represents the mass of radium over time, \( t \), in years.

\[
M(t) = 100e^{\frac{\ln\left(\frac{1}{2}\right)}{1590} t}
\]

Determine if the function \( M(t) \) represents growth or decay. Explain your reasoning.

3 If the function \( g(x) = ab^x \) represents exponential growth, which statement about \( g(x) \) is false?
   1) \( a > 0 \) and \( b > 1 \)
   2) The \( y \)-intercept is \((0, a)\).
   3) The asymptote is \( y = 0 \).
   4) The \( x \)-intercept is \((b, 0)\).

4 Which statement about the graph of the equation \( y = e^x \) is not true?
   1) It is asymptotic to the \( x \)-axis.
   2) The domain is the set of all real numbers.
   3) It lies in Quadrants I and II.
   4) It passes through the point \((e, 1)\).

5 Which statement is true about the graph of \( f(x) = \left( \frac{1}{8} \right)^x \)?
   1) The graph is always increasing.
   2) The graph is always decreasing.
   3) The graph passes through \((1, 0)\).
   4) The graph has an asymptote, \( x = 0 \).

6 If \( y = 2^x \) and \( y = \left( \frac{1}{2} \right)^x \) are graphed on the same set of coordinate axes, which transformation would map one of these curves onto the other?
   1) reflection in the \( y \)-axis
   2) reflection in the \( x \)-axis
   3) reflection in the line \( y = x \)
   4) reflection in the origin

7 If \( a > 0 \), which function represents the reflection of \( y = a^x \) in the \( y \)-axis?
   1) \( y = -a^x \)
   2) \( y = \left( \frac{1}{a} \right)^x \)
   3) \( y = \left( \frac{1}{a} \right)^{-x} \)
   4) \( x = a^y \)

8 Describe the transformation applied to the graph of \( p(x) = 2^x \) that forms the new function \( q(x) = 2^{x-3} + 4 \).
9 The graph of \( f(x) \) is shown in the accompanying diagram.

Which graph represents \( f(x) \)?

1)

2)

3)

4)

10 The strength of a medication over time is represented by the equation \( y = 200(1.5)^{-x} \), where \( x \) represents the number of hours since the medication was taken and \( y \) represents the number of micrograms per millimeter left in the blood. Which graph best represents this relationship?

1)

2)

3)

4)
11 The graph of the equation \( y = \left( \frac{1}{2} \right)^x \) has an asymptote. On the grid below, sketch the graph of \( y = \left( \frac{1}{2} \right)^x \) and write the equation of this asymptote.

12 On the axes below, for \(-2 \leq x \leq 2\), graph \( y = 2^{x+1} - 3 \).

13 Graph \( y = 400(0.85)^{2x} - 6 \) on the set of axes below.
F.IF.C.7: Graphing Exponential Functions 2

Answer Section

1 ANS: 4

\[ y = 5^{-t} = \left( \frac{1}{5} \right)^t \]

REF: 061615aii

2 ANS:

\[ \frac{\ln \frac{1}{2}}{1590} \]

is negative, so \( M(t) \) represents decay.

REF: 011728aai

3 ANS: 4

There is no \( x \)-intercept.

REF: 011823aaii

4 ANS: 4 REF: 011219a2

5 ANS: 2 REF: 061802aaii

6 ANS: 1

\[ 2^{-x} = \left( \frac{1}{2} \right)^x \text{ and } \left( \frac{1}{2} \right)^{-x} = 2^x \]

REF: fall9908b

7 ANS: 2 REF: 080919b

8 ANS:

Translation 3 units right and 4 units up

REF: 012027AII

9 ANS: 2 REF: 080115b

10 ANS: 1 REF: 080304b
11 ANS:

\[ y = 0 \]

REF: 061031a2

12 ANS:

REF: 011233a2

13 ANS:

REF: 061729a2