05-02 Sample Quiz - Graphing Exponential Functions

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

1. Which of the choices below is an asymptote of the equation, \( y = 2(3)^x - 1 \)?
   a. \( y = 2 \)  
   b. \( y = -1 \)  
   c. \( x = 0 \)  
   d. \( x = 2 \)

2. Given \( g(x) \) is an exponential function shown in the graph, what is most likely the asymptote of the function?
   a. \( x = 0 \)  
   b. \( y = 0 \)  
   c. \( x = 6 \)  
   d. \( y = -3 \)

3. Which function below has an asymptote at \( y = b \)?
   a. \( f(x) = a \cdot b^x + c \)  
   b. \( g(x) = c \cdot b^x + a \)  
   c. \( h(x) = b \cdot a^x + c \)  
   d. \( k(x) = a \cdot c^x + b \)

4. Which function below has a different asymptote than the rest of the functions?
   a. \( f(x) = 3^x + 2 \)  
   b. \( g(x) = 4^x + 2 \)  
   c. \( h(x) = 4^x + 3 \)  
   d. \( k(x) = 4^x + 2 \)
5. What is the **domain** and **range** of \( h(x) \) shown in the graph?

![Graph of \( h(x) \)]

- **a.** \( \text{Domain: } \{ \text{ALL REALS (} \mathbb{R} \text{)} \} \)
  
  \( \text{Range: } \{ \text{ALL REALS (} \mathbb{R} \text{)} \} \)

- **b.** \( \text{Domain: } \{ \text{ALL REALS (} \mathbb{R} \text{)} \} \)
  
  \( \text{Range: } y > 0 \)

- **c.** \( \text{Domain: } x > -1 \)
  
  \( \text{Range: } y > 0 \)

- **d.** \( \text{Domain: } \{ \text{ALL REALS (} \mathbb{R} \text{)} \} \)
  
  \( \text{Range: } y > 2 \)

6. The function, \( f(x) = ax + c \), is graphed at the right.

What is the **range** of the function \( f(x) \) shown?

![Graph of \( f(x) = ax + c \)]

- **a.** \( \text{Range: } f(x) > c \)
- **b.** \( \text{Range: } f(x) > a \)
- **c.** \( \text{Range: } f(x) < b \)
- **d.** \( \text{Range: } \{ \text{ALL REALS (} \mathbb{R} \text{)} \} \)
7. A exponential function shown below is of the form \( v(x) = b^x + c \).

![Graph of \( v(x) = b^x + c \)](image)

Which of the following is true about the parameters of \( v(x) = b^x + c \)?

a. The parameter \( b \) must be 2; \( b = 2 \)
b. The parameter \( b \) must be 1; \( b = 1 \)
c. The parameter \( c \) must be 2; \( c = 2 \)
d. The parameter \( c \) must be 1; \( c = 1 \)

8. An exponential function is of the form \( f(x) = a^x + c \) which is shown in the graph.

![Graph of \( f(x) = a^x + c \)](image)

Which of the following must be true of the parameter \( a \)?

a. \( a = 0 \)
b. \( a > 2 \)
c. \( 0 < a < 1 \)
d. \( a < 0 \)

9. If the original exponential function defined by \( y = 4^x \), how would it change if \( y = 2 \cdot 4^{(x-3)} + 1 \) were graphed instead?

a. The exponential function would be **vertically stretched factor 2**, translated **right 3** and **up 1**.
b. The exponential function would be **vertically compressed factor \( \frac{1}{2} \)**, translated **left 3** and **down 1**.
c. The exponential function would be **vertically compressed factor \( \frac{1}{2} \)**, translated **right 3** and **down 1**.
d. The exponential function would be **vertically stretched factor 2**, translated **left 3** and **up 1**.
10. Given \( t(x) \) is a transformation of the graph \( f(x) = 2^x \), determine which of the below correctly describe \( t(x) \)?

\[
\begin{align*}
a. & \quad t(x) = 2^{(x-1)} - 3 \\
b. & \quad t(x) = 2^{(x+1)} - 3 \\
c. & \quad t(x) = 2^{(x-1)} + 3 \\
d. & \quad t(x) = 2^{(x+1)} + 3
\end{align*}
\]

11. Consider a partial set of ordered values of the function \( f(x) = 3^x \):

<table>
<thead>
<tr>
<th>( x )</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f(x) )</td>
<td>( \frac{1}{3} )</td>
<td>1</td>
<td>3</td>
<td>9</td>
<td>27</td>
</tr>
</tbody>
</table>

Given \( g(x) \) is a transformation of the graph \( f(x) \) and the following set shows a partial set of ordered values of \( g(x) \):

<table>
<thead>
<tr>
<th>( x )</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( g(x) )</td>
<td>( \frac{1}{3} )</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>28</td>
</tr>
</tbody>
</table>

Describe how \( f(x) \) is transformed to describe \( g(x) \).

a. The function \( f(x) \) would be translated left 1.
b. The function \( f(x) \) would be translated right 1.
c. The function \( f(x) \) would be translated down 1.
d. The function \( f(x) \) would be translated up 1.
12. Given \( h(x) \) is a transformation of the graph \( f(x) = 2^x \), determine which of the below correctly describe \( h(x) \)?

a. \( h(x) = -2^{-x} \)  
b. \( h(x) = -2^x \)  
c. \( h(x) = 2^{-x} \)  
d. \( h(x) = 2^x - 1 \)