1. (Review) Write an equation to describe each **linear function** graphed below.

   A. \( f(x) = -\frac{3}{4}x - 2 \)

   B. \( h(x) = \frac{3}{5}x - 2 \)

   C. \( g(x) = 0x - 3 \)

2. (Review) Write an equation to describe each **linear function** based on the provided information.

   A. The linear function, \( k(x) \), has a slope of \( \frac{3}{4} \) and a y-intercept of \( -2 \).

   \[
   k(x) = \frac{3}{4}x - 2
   \]

   B. The linear function, \( a(x) \), passes through the point \((5, -2)\) and has a slope of \( \frac{5}{4} \).

   \[
   a(x) = \frac{4}{5}x - 6
   \]

   C. The linear function, \( h(x) \), passes through the points \((3, 1)\) and \((-6, 7)\).

   \[
   h(x) = \frac{2}{3}x + b
   \]

   D. The linear function, \( p(x) \), is parallel to the function \( t(x) = \frac{2}{3}x - 5 \) and passes through the point \((6, 2)\).

   \[
   p(x) = \frac{2}{3}x - 2
   \]
3. (Review) Write an equation to describe each quadratic function graphed below.

A.

\[ f(x) = a(x-h)^2 + k \]
\[ f(x) = 3(x + 4)^2 - 5 \]
\[ 3 = \alpha \]

B.

\[ h(x) = a(x-h)^2 + k \]
\[ h(x) = \frac{1}{4}(x-3)^2 + 6 \]
\[ \frac{-1}{4} = a \]

4. (Review) Write an equation to describe each quadratic function based on the provided information.

A. The quadratic function, \( w(x) \), has a vertex \((5, -2)\) and an x-intercept of 3.

\[ w(x) = a(x-h)^2 + k \]
\[ w(x) = a(x-5)^2 - 2 \]
\[ 0 = a(3-5)^2 - 2 \]
\[ 0 = a(-2)^2 - 2 \]
\[ 0 = 4a - 2 \]
\[ \frac{2}{4} = \frac{4a}{4} \]
\[ \frac{1}{2} = a \]

B. The quadratic function has x-intercepts at -1 and 3. The function also passes through the point \((2, -6)\).

\[ g(x) = a(x-h_1)(x-h_2) \]
\[ g(x) = a(x-1)(x-3) \]
\[ g(x) = a(x+1)(x-3) \]
\[ -6 = a(2+1)(2-3) \]
\[ -6 = a(3)(-1) \]
\[ -6 = -3a \]
\[ -2 = a \]

\[ g(x) = 2(x+1)(x-3) \]
5. (Review) Consider the exponential function, \( f(x) = 3^x \).
A. Fill in the missing values in the table below.

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>( 3^2 = 9 )</td>
</tr>
<tr>
<td>0</td>
<td>( 3^0 = 1 )</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>1</td>
<td>( 3^1 = 3 )</td>
</tr>
<tr>
<td>-1</td>
<td>( 3^{-1} = \frac{1}{3} \approx .33 )</td>
</tr>
<tr>
<td>-3</td>
<td>( 3^{-3} = \frac{1}{27} \approx .04 )</td>
</tr>
</tbody>
</table>

B. Plot the points from the table and sketch a graph. Label any asymptotes.

6. Consider the exponential function, \( g(x) = 2^x - 2 \).
A. Fill in the missing values in the table below.

<table>
<thead>
<tr>
<th>( x )</th>
<th>( g(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>( 2^2 - 2 = 4 - 2 = 2 )</td>
</tr>
<tr>
<td>3</td>
<td>( 2^3 - 2 = 8 - 2 = 6 )</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>-1</td>
<td>( 2^{-1} - 2 = \frac{1}{2} - 2 = -\frac{3}{2} \approx -1.5 )</td>
</tr>
<tr>
<td>-3</td>
<td>( 2^{-3} - 2 = \frac{1}{8} - 2 = -\frac{15}{8} = -1.875 )</td>
</tr>
</tbody>
</table>

B. Plot the points from the table and sketch a graph. Label any asymptotes.

7. Consider the exponential function, \( h(x) = \left(\frac{1}{2}\right)^x + 1 \).
A. Fill in the missing values in the table below.

<table>
<thead>
<tr>
<th>( x )</th>
<th>( h(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>( \left(\frac{1}{2}\right)^{-3} + 1 = 8 + 1 = 9 )</td>
</tr>
<tr>
<td>-1</td>
<td>( \left(\frac{1}{2}\right)^{-1} + 1 = 2 + 1 = 3 )</td>
</tr>
<tr>
<td>0</td>
<td>( \left(\frac{1}{2}\right)^0 + 1 = 1 + 1 = 2 )</td>
</tr>
<tr>
<td>1</td>
<td>( \left(\frac{1}{2}\right)^1 + 1 = \frac{1}{2} + 1 = 1.5 = \frac{3}{2} )</td>
</tr>
<tr>
<td>2</td>
<td>( \left(\frac{1}{2}\right)^2 + 1 = \frac{1}{4} + 1 = 1.25 = \frac{5}{4} )</td>
</tr>
<tr>
<td>3</td>
<td>( \left(\frac{1}{2}\right)^3 + 1 = \frac{1}{8} + 1 = 1.125 = \frac{9}{8} )</td>
</tr>
</tbody>
</table>

B. Plot the points from the table and sketch a graph. Label any asymptotes.
8. Determine the asymptote and sketch a graph (label the any intercepts, points when \( x = 0 \), and when \( x = 1 \).)

A. \( f(x) = 3^x - 4 \)  
\[ \begin{align*} 
(0, -3) & \\
(1, -1) & \\
\text{Asymptote: } & y = -4 \\
\end{align*} \]

B. \( g(x) = \left(\frac{1}{2}\right)^x + 2 \)  
\[ \begin{align*} 
(0, 3) & \\
(1, 2.5) & \\
(-1, 4) & \\
\text{Asymptote: } & y = 2 \\
\end{align*} \]

C. \( h(x) = -2^x - 3 \)  
\[ \begin{align*} 
(0, -4) & \\
(1, -5) & \\
(-1, -3) & \\
\text{Asymptote: } & y = -3 \\
\end{align*} \]

9. Create two different exponential functions of the form \( f(x) = a \cdot b^x + c \) that have a horizontal asymptote at \( y = 5 \).

\[ \begin{align*} 
f(x) &= 2^x + 5 \\
g(x) &= 3^x + 5 \\
h(x) &= 4 \cdot 2^x + 5 \\
\end{align*} \]

10. Given the function \( f(x) \) is of the form \( f(x) = a \cdot b^x + c \), has a horizontal asymptote at \( y = -1 \), and passes through the point \((0,2)\), create a possible function for \( f(x) \).

\[ \begin{align*} 
f(x) &= a \cdot b^x + c \\
2 &= a \cdot b^0 + c \\
2 &= a + c \\
c &= 2 - a \\
3 &= a \\
\end{align*} \]

11. Consider \( t(x) \) is of the form \( t(x) = a^x + c \).

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

- \( a > 1 \)
- \( 0 < a < 1 \)
- \( a < 0 \)

Which of the following must be true for the parameter ‘\( c \)’?

- \( c > 0 \)
- \( c = 0 \)
- \( c < 0 \)

12. Consider \( w(x) \) is of the form \( w(x) = a^x + c \).

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

- \( a > 1 \)
- \( 0 < a < 1 \)
- \( a < 0 \)

Which of the following must be true for the parameter ‘\( c \)’?

- \( c > 0 \)
- \( c = 0 \)
- \( c < 0 \)
13. Determine the x-intercept and y-intercept of the following exponential functions:
   a. \( r(x) = 3 \cdot 2^x - 6 \)
      \[ \text{X-INT: } (0, 3) \text{ and Y-INT: } (0, 3) \]
   b. \( r(x) = -1 \cdot 3^x + 9 \)
      \[ \text{X-INT: } (0, 9) \text{ and Y-INT: } (0, 9) \]

14. Tell which functions below are linear, quadratic, or exponential and if it is exponential determine whether it could represent exponential growth or exponential decay.