1. For the given functions \( f(x) = 2x \) and \( g(x) = 3x^2 + 1 \), find:
(4 points)

a) \((f \circ g)(4)\) \(f\left(\frac{4}{9}\right) = 98\)

b) \((g \circ f)(2)\) \(g(4) = 49\)

c) \((f \circ f)(1)\) \(f(2) = 4\)

d) \((g \circ g)(0)\) \(g(1) = 4\)

2. Verify \(f\) and \(g\) are inverses by showing that \(f(g(x)) = g(f(x)) = x\).
(4 points)

\[
f(x) = x^3 - 8 \quad \text{and} \quad g(x) = \sqrt[3]{x + 8}
\]

\[
\begin{align*}
&f \left( g(x) \right) = \left( \sqrt[3]{x + 8} \right)^3 - 8 = x + 8 - 8 = x \\
g \left( f(x) \right) = \sqrt[3]{x^3 - 8 + 8} = \sqrt[3]{x^3} = x
\end{align*}
\]
3. Solve the equations. Be sure that the solutions work for the domain. (6 points)
   
   a) \[ 2^x = 10 \]
   \[ \ln 2^x = \ln 10 \]
   \[ x \ln 2 = \ln 10 \]
   \[ x = \frac{\ln 10}{\ln 2} \]

   b) \[ \log_2(x+7) + \log_2(x+8) = 1 \]
   \[ \log_2 (x+7)(x+8) = 2 \]
   \[ x^2 + 15x + 56 = 2 \]
   \[ x^2 + 15x + 54 = 0 \]
   \[ (x + 9)(x + 6) = 0 \]
   \[ x = -9, \ x = -6 \]
   \[ \{ -6 \} \]

4. Find the principal needed now (present value) to get $1000 after 2 \frac{1}{2} \text{ years at 6\% compounded daily. Use the appropriate formula below. (3 points) }$

   \[ P = Ae^{-\alpha} \]
   \[ A = P \left(1 + \frac{r}{n}\right)^n \]
   \[ P = A(1 + \frac{r}{n})^{-n} \]
   \[ A = Pe^n \]

\[ P = 1000 \left(1 + \frac{0.06}{365}\right)^{(-365)(2.5)} \]
\[ P = 860.72 \]

5. Match the graphs to the functions. (3 points)

   a) \[ y = 3^x \]
   b) \[ y = 3^{-x} \]
   c) \[ y = -3^x \]
   d) \[ y = 3^x - 1 \]