1. Write the equation of a polynomial function with the given characteristics. Use a leading coefficient of 1 or \(-1\) and make the degree of the function as small as possible.

   Touches the x-axis at 0 and crosses the x-axis at 2; lies below the x-axis between 0 and 2.

   - A. \( f(x) = -x^3 - 2x^2 \)
   - B. \( f(x) = x^3 + 2x^2 \)
   - C. \( f(x) = -x^3 + 2x^2 \)
   - D. \( f(x) = x^3 - 2x^2 \)

2. Find the domain of the rational function.

   \[ g(x) = \frac{x + 9}{x^2 - 64} \]

   - A. \( \{x|x \neq 0, x \neq 64\} \)
   - B. \( \{x|x \neq -8, x \neq 8\} \)
   - C. all real numbers
   - D. \( \{x|x \neq -8, x \neq 8, x \neq -9\} \)

3. Find the slant asymptote, if any, of the graph of the rational function.

   \[ f(x) = \frac{x^2 - 7x + 3}{x + 9} \]

   - A. \( y = x - 16 \)
   - B. \( x = y + 7 \)
   - C. \( y = x + 10 \)
   - D. no slant asymptote
4. Solve the rational inequality and graph the solution set on a real number line. Express the solution set in interval notation.

\[
\frac{x + 17}{x + 7} < 7
\]

- **A.** \((-\infty, -\frac{16}{3})\) or \((7,\infty)\)
- **B.** \((-\infty, -7)\) or \((-\frac{16}{3},\infty)\)
- **C.** \((-7, -\frac{16}{3})\)
- **D.** \(\emptyset\)

5. Evaluate the expression without using a calculator.

\[
\log_5\sqrt{5}
\]

- **A.** \(\frac{1}{2}\)
- **B.** \(\frac{1}{5}\)
- **C.** 1
- **D.** 5

6. Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Where possible, evaluate logarithmic expressions.

\[4 \log_b y + 8 \log_b z\]

- **A.** \(32 \log_b yz\)
- **B.** \(\log_b (yz)^{12}\)
- **C.** \(\log_b y^4 z^8\)
- **D.** \(12 \log_b yz\)
7. Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Where possible, evaluate logarithmic expressions.

\[ \log x + \log (x^2 - 25) - \log 3 - \log (x - 5) \]

- **A.** \[ \log \frac{x(x - 25)(x - 5)}{3} \]
- **B.** \[ \log \frac{x(x - 25)}{3(x - 5)} \]
- **C.** \[ \log \frac{x(x + 5)}{3} \]
- **D.** \[ \log \frac{2x + 5}{(8 - x)} \]
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