MASTER COPY*DO NOT WRITE ON THIS*MASTER COPY*DO NOT WRITE ON THIS*MASTER COPY*DO NOT WRITE

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

**Determine algebraically whether the function is even, odd, or neither even nor odd.**

1) $f(x) = x + \frac{9}{x}$ 1) _____

A) Neither B) Odd C) Even

**Simplify the expression. Assume that the variables in the denominator are nonzero.**

2) $\frac{\left(x^{-2}y^{4}\right)^{-3}}{\left(y^{4}x^{-4}\right)^{-4}}$ 2) _____

A) $\frac{x^{10}}{y^{4}}$ B) $\frac{y^{4}}{x^{6}}$ C) $\frac{y^{4}}{x^{10}}$ D) $\frac{x^{6}}{y^{4}}$

3) $\left(\frac{15a^{6}b^{6}}{ab^{3}}\right)\left(\frac{2b^{2}}{5a^{3}b^{8}}\right)$ 3) _____

A) $\frac{3a^{2}}{b^{3}}$ B) $\frac{6a^{2}}{b^{3}}$ C) $6a^{2}b^{3}$ D) $\frac{1}{6a^{2}b^{3}}$

**Use limits to describe the behavior of the rational function near the indicated asymptote.**

4) $f(x) = -\frac{8}{x + 2}$ 4) _____

Describe the behavior of the function near its vertical asymptote.

A) $\lim_{x \to 2^{-}} f(x) = \infty$, $\lim_{x \to 2^{+}} f(x) = -\infty$

B) $\lim_{x \to -2^{-}} f(x) = 0$, $\lim_{x \to -2^{+}} f(x) = 0$

C) $\lim_{x \to -2^{-}} f(x) = \infty$, $\lim_{x \to -2^{+}} f(x) = -\infty$

D) $\lim_{x \to -2^{-}} f(x) = \infty$, $\lim_{x \to -2^{+}} f(x) = \infty$

**Find the asymptote(s) of the given function.**

5) $h(x) = \frac{7x^{2}}{7x^{2} - 5}$ horizontal asymptotes(s) 5) _____

A) $y = 1$ B) $y = 5$ C) $y = \sqrt{5}$ D) None

6) $f(x) = \frac{x - 2}{x^{2} + 4x}$ vertical asymptotes(s) 6) _____

A) $x = -4$ B) $x = 0, x = -4$ C) $x = 4$ D) $x = 2$

**Perform the requested operation or operations.**

7) $f(x) = x^{2} + 9$; $g(x) = \sqrt{x - 7}$ 7) _____

Find f(g(x)).

A) $f(g(x)) = x + 2$

B) $f(g(x)) = (x^{2} + 9)(\sqrt{x - 7})$

C) $f(g(x)) = \frac{\sqrt{x - 7}}{x^{2} + 9}$

D) $f(g(x)) = \sqrt{x^{2} + 2}$

**State whether the function is an exponential growth function or exponential decay function, and describe its end behavior using limits.**

8) $f(x) = \left(\frac{1}{6}\right)^{-x}$ 8) _____

A) Exponential growth function; $\lim_{x \to -\infty} f(x) = 0$; $\lim_{x \to \infty} f(x) = \infty$

B) Exponential decay function; $\lim_{x \to -\infty} f(x) = 0$; $\lim_{x \to \infty} f(x) = \infty$

C) Exponential growth function; $\lim_{x \to -\infty} f(x) = \infty$; $\lim_{x \to \infty} f(x) = 0$

D) Exponential decay function; $\lim_{x \to -\infty} f(x) = \infty$; $\lim_{x \to \infty} f(x) = 0$

**Solve the inequality graphically.**

9) $3^{-x} < 9^{-x}$ 9) _____

A) $x < 1$ B) $x > 0$ C) $x < 0$ D) $x > 1$

**Perform the requested operation or operations. Find the domain of each.**

10) $f(x) = \sqrt{x}$; $g(x) = 2x - 7$ 10) _____

Find f/g.

A) $(f/g)(x) = \frac{\sqrt{x}}{2x - 7}$; domain $\{x \mid x \neq \frac{7}{2}\}$

B) $(f/g)(x) = \frac{\sqrt{x}}{2x - 7}$; domain $\{x \mid x \geq 0, x \neq \frac{7}{2}\}$

C) $(f/g)(x) = \frac{\sqrt{x}}{2x - 7}$; domain $\{x \mid x \neq 0\}$

D) $(f/g)(x) = \frac{2x - 7}{\sqrt{x}}$; domain $\{x \mid x \geq 0\}$

**Compute the exact value of the function for the given x–value without using a calculator.**

11) $f(x) = \left(\frac{1}{4}\right)^{x}$ for $x = -1$ 11) _____

A) $-\frac{1}{4}$ B) 4 C) $-4$ D) $\frac{1}{4}$

**Find the domain of the given function.**

12) $f(x) = \frac{\sqrt{x + 5}}{(x + 6)(x - 4)}$ 12) _____

A) $(-\infty, -6) \cup (-6\ -5) \cup (-5, 4) \cup (4, \infty)$

B) $[-5, 4) \cup (4, \infty)$

C) All real numbers

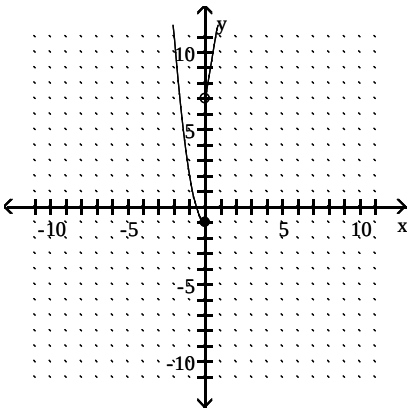
D) $(0, \infty)$

**Graph the piecewise–defined function.**

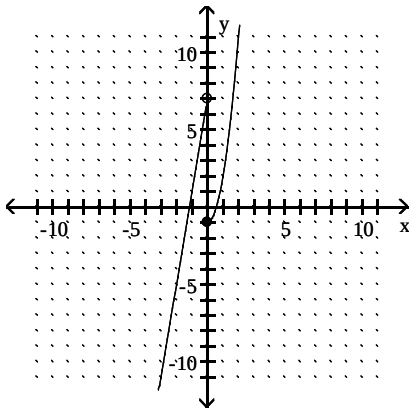
13) 13) _____

$$y(x) = \begin{cases} 6x + 7, \text{ if } x < 0 \\ 3x^2 - 1, \text{ if } x \geq 0 \end{cases}$$

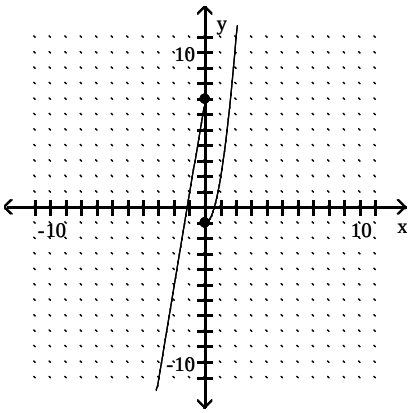
A)



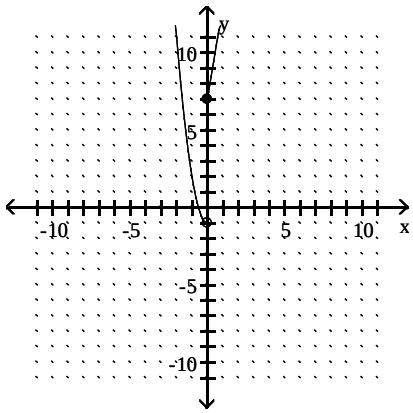

B)




C)




D)




**Describe the end behavior of the polynomial function by finding $\lim_{x \to \infty} f(x)$ and $\lim_{x \to -\infty} f(x)$.**

14) $f(x) = -x^3 + 2x^2 - 2x + 10$ 14) _____

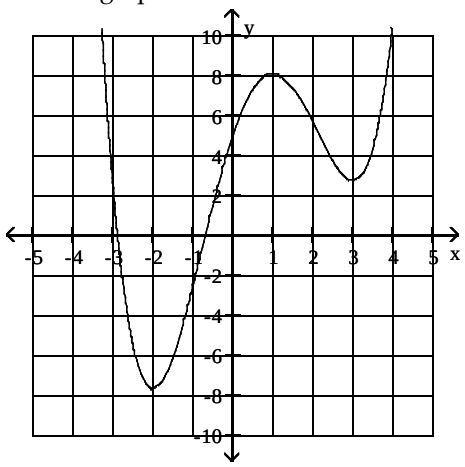
A) $-\infty, \infty$ B) $\infty, -\infty$ C) $-\infty, -\infty$ D) $\infty, \infty$

**Solve the problem.**

15) The number of students infected with the flu on a college campus after t days is modeled by the function $P(t) = \dfrac{240}{1 + 39e^{-0.3t}}$. What is the maximum number of infected students possible? 15) _____

A) 480 B) 120 C) 240 D) 6

16) Use the graph of f to estimate the local maximum and local minimum. 16) _____




A) No local maximum; local minimum: approx. –7.67
B) Local maximum: ∞; local minima: –2 and 3
C) Local maximum: 1; local minima: –2 and 3
D) Local maximum: approx. 8.08; local minima: approx. –7.67 and 2.75

17) Suppose the amount of a radioactive element remaining in a sample of 100 milligrams after x years can be described by $A(x) = 100e^{-0.01069x}$. How much is remaining after 212 years? Round the answer to the nearest hundredth of a milligram. 17) _____

A) 964.35 milligrams
B) 226.63 milligrams
C) 0.10 milligrams
D) 10.37 milligrams

**Solve the quadratic inequality by graphing an appropriate quadratic function.**

18) $x^2 - 3x - 4 \le 0$ 18) _____

A) $[4, \infty)$ B) $(-\infty, -1] \cup [4, \infty)$ C) $(-\infty, -1]$ D) $[-1, 4]$

**Describe how to transform the graph of f into the graph of g.**

19) $f(x) = \sqrt{x}$ and $g(x) = \sqrt{0.5x}$ 19) _____

A) Vertically stretch the graph of f by a factor of 2.
B) Horizontally compress the graph of f by a factor of 50.
C) Vertically compress the graph of f by a factor of 50.
D) Horizontally stretch the graph of f by a factor of 2.

**Solve the inequality.**

20) $\frac{5x + 10}{11} \ge -3$ 20) _____

A) $x \ge -\frac{43}{5}$ B) $x \le -\frac{43}{5}$ C) $x \le -\frac{23}{5}$ D) $x \ge -\frac{33}{5}$

1) B
2) C
3) B
4) C
5) A
6) B
7) A
8) A
9) C
10) B
11) B
12) B
13) B
14) A
15) C
16) D
17) D
18) D
19) D
20) A