College Algebra (Math 1023) **Practice Final Exam I**

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

Evaluate the expression using the given values.

1) $\frac{2xy + 60}{x}$ $x = 5, y = 7$ 1) _____

A) 12 B) 74 C) 26 D) 14

Solve the equation by factoring.

2) $4x^2 + 3x - 10 = 0$ 2) _____

A) $\{\frac{5}{4}, 2\}$ B) $\{-\frac{5}{4}, 2\}$ C) $\{-\frac{5}{4}, -2\}$ D) $\{\frac{5}{4}, -2\}$

Find the real solutions, if any, of the equation. Use the quadratic formula.

3) $8x^2 - x + 4 = 0$ 3) _____

A) $\{\frac{-1 + \sqrt{129}}{16}, \frac{1 + \sqrt{129}}{16}\}$ B) $\{\frac{-1 - \sqrt{129}}{16}, \frac{1 + \sqrt{129}}{16}\}$

C) $\{\frac{-1 - \sqrt{129}}{16}, \frac{-1 + \sqrt{129}}{16}\}$ D) no real solution

Write the expression in the standard form a + bi.

4) $(6 + 6i)(2 - 3i)$ 4) _____

A) $30 + 6i$ B) $-6 + 30i$ C) $-18i^2 - 6i + 12$ D) $30 - 6i$

Find the real solutions of the equation.

5) $\sqrt{x^2 - 3x + 18} = x + 2$ 5) _____

A) {0} B) {-2} C) {2} D) {4}

Solve the equation.

6) $3|x - 3| = 18$ 6) _____

A) {3} B) {3, -9} C) {9, -3} D) no solution

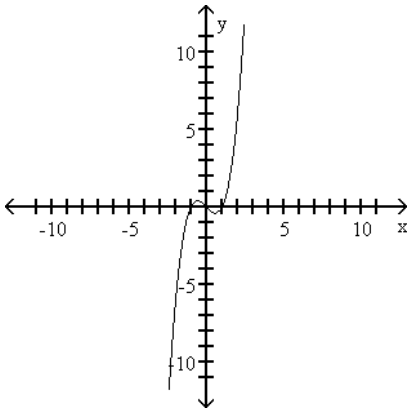
Solve the problem.

7) A boat heads upstream a distance of 30 miles on the Mississippi river, whose current is running at 5 miles per hour. If the trip back takes an hour less, what was the speed of the boat in still water? Give the answer rounded to two decimal places, if necessary. 7) _____

A) 15 mph B) 16.58 mph C) 6 mph D) 18.03 mph

List the intercepts of the graph.Tell whether the graph is symmetric with respect to the x-axis, y-axis, origin, or none of these.

8) 8) _____




A) intercepts: (-1, 0), (0, 0), (1, 0)
symmetric with respect to origin

B) intercepts: (-1, 0), (0, 0), (1, 0)
symmetric with respect to x-axis

C) intercepts: (-1, 0), (0, 0), (1, 0)
symmetric with respect to x-axis, y-axis, and origin

D) intercepts: (-1, 0), (0, 0), (1, 0)
symmetric with respect to y-axis

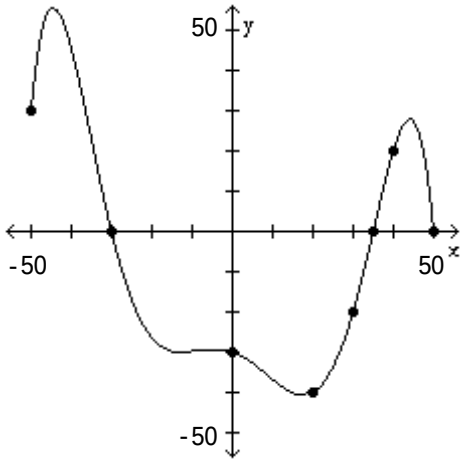
Solve the problem.

9) It has been determined that the number of fish f(t) that can be caught in t minutes in a certain pond using a certain bait is $f(t) = 0.27t + 1$, for $t > 10$. Find the approximate number of fish that can be caught if you fish for 35 minutes. 9) _____

A) About 39 fish B) About 10 fish C) About 37 fish D) About 22 fish

The graph of a function f is given. Use the graph to answer the question.

10) For which of the following values of x does f(x) = 30? 10) _____




A) 80 B) -50 C) 0 D) 30

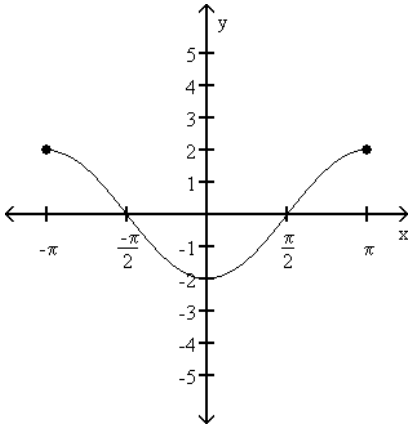
Answer the question about the given function.

11) Given the function $f(x) = x^2 + 4x - 32$, list the x-intercepts, if any, of the graph of f. 11) _____

A) (-8, 0), (4, 0) B) (-8, 0), (1, 0) C) (8, 0), (-4, 0) D) (8, 0), (4, 0)

The graph of a function is given. Decide whether it is even, odd, or neither.

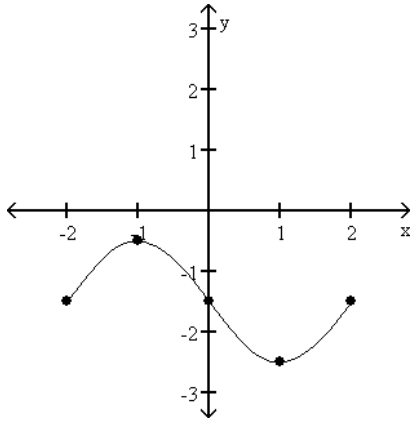
12) 12) _____




A) even B) odd C) neither

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

13) (1, 2) 13) _____




A) decreasing B) constant C) increasing

Determine the domain and the range of the function.

14) $f(x) = -x^2 + 2x + 8$ 14) _____

A) domain: all real numbers
range: $\{y \mid y \le -9\}$

B) domain: all real numbers
range: all real numbers

C) domain: $\{x \mid x \le -1\}$
range: $\{y \mid y \le 9\}$

D) domain: all real numbers
range: $\{y \mid y \le 9\}$

Determine, without graphing, whether the given quadratic function has a maximum value or a minimum value and then find that value.

15) $f(x) = -11x^2 - 2x - 7$ 15) _____

A) maximum; $\frac{76}{11}$

B) minimum; $\frac{76}{11}$

C) minimum; $-\frac{76}{11}$

D) maximum; $-\frac{76}{11}$

Solve the problem.

16) The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -0.004x^2 + 2.8x - 250$. Find the number of pretzels that must be sold to maximize profit. 16) _____

A) 240 pretzels B) 350 pretzels C) 1.4 pretzels D) 700 pretzels

Solve the inequality.

17) $x^2 + 3x \ge 0$ 17) _____

A) $\{x \mid x \le 0 \text{ or } x \ge 3\}$; $(-\infty, 0]$ or $[3, \infty)$

B) $\{x \mid -3 \le x \le 0\}$; $[-3, 0]$

C) $\{x \mid x \le -3 \text{ or } x \ge 0\}$; $(-\infty, -3]$ or $[0, \infty)$

D) $\{x \mid 0 \le x \le 3\}$; $[0, 3]$

Form a polynomial whose zeros and degree are given.

18) Zeros: -1, 1, - 9; degree 3 18) _____

A) $f(x) = x^3 + 9x^2 + x + 9$ for $a = 1$

B) $f(x) = x^3 - 9x^2 - x + 9$ for $a = 1$

C) $f(x) = x^3 - 9x^2 + x - 9$ for $a = 1$

D) $f(x) = x^3 + 9x^2 - x - 9$ for $a = 1$

For the polynomial, list each real zero and its multiplicity. Determine whether the graph crosses or touches the x-axis at each x -intercept.

19) $f(x) = 4(x + 3)(x - 1)^3$ 19) _____

A) -3, multiplicity 1, crosses x-axis; 1, multiplicity 3, crosses x-axis

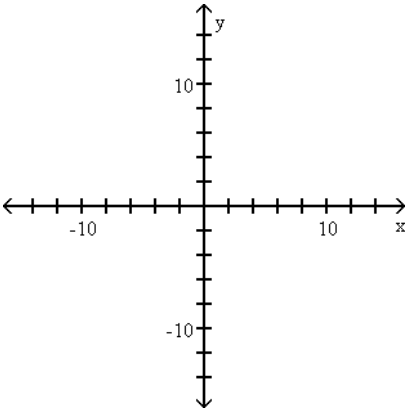
B) -3, multiplicity 1, touches x-axis; 1, multiplicity 3

C) 3, multiplicity 1, touches x-axis; -1, multiplicity 3

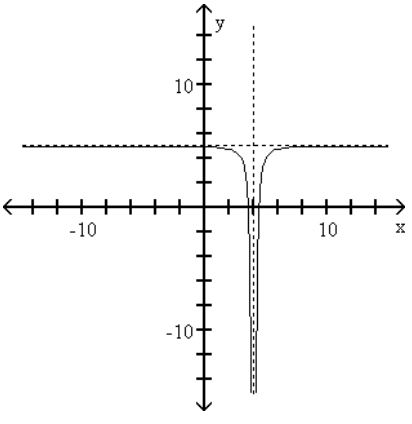
D) 3, multiplicity 1, crosses x-axis; -1, multiplicity 3, crosses x-axis

Graph the function using transformations.

20) $f(x) = 5 - \dfrac{1}{(x + 4)^2}$ 20) _____




A)

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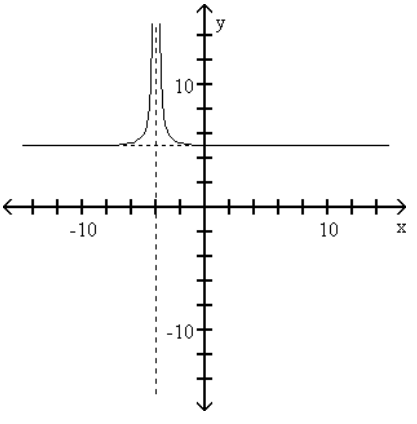
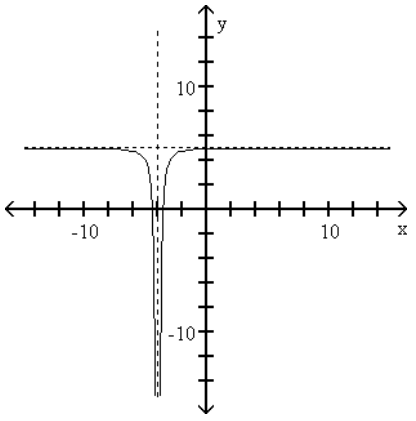
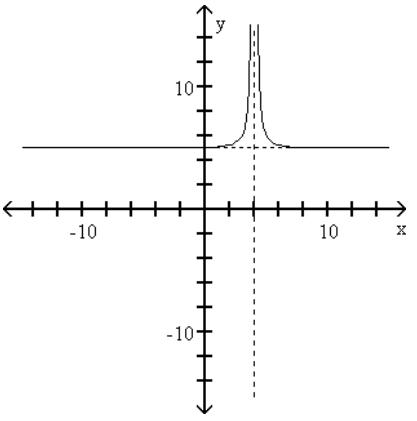


C)




D)




Give the equation of the horizontal asymptote, if any, of the function.

21) $T(x) = \dfrac{8x^2 - 9x - 4}{3x^2 - 8x + 8}$ 21) _____

A) $y = 0$ B) $y = \dfrac{9}{8}$ C) $y = \dfrac{8}{3}$ D) none

Solve the inequality. Express the solution using interval notation.

22) $x^3 - 5x^2 - 14x > 0$ 22) _____

A) $(-7, 0)$ or $(2, \infty)$ B) $(-2, 0)$ or $(7, \infty)$ C) $(-2, \infty)$ D) $(-\infty, -2)$ or $(0, 7)$

Solve the equation in the real number system.

23) $2x^4 - 2x^3 + x^2 - 5x - 10 = 0$ 23) _____

A) $\{-1, 2\}$ B) $\left\{-\dfrac{5}{2}, \dfrac{5}{2}\right\}$ C) $\left\{-\dfrac{\sqrt{10}}{2}, \dfrac{\sqrt{10}}{2}\right\}$ D) $\{1, -2\}$

Use the Factor Theorem to determine whether $x - c$ is a factor of $f(x)$.

24) $f(x) = x^4 - 5x^2 - 36;\ x - 6$ 24) _____

A) Yes B) No

Information is given about a polynomial $f(x)$ whose coefficients are real numbers. Find the remaining zeros of $f$.

25) Degree 3; zeros: $-7, 7 - 5i$ 25) _____

A) $7, 7 + 5i$ B) $-7 + 5i$ C) $7, -7 + 5i$ D) $7 + 5i$