

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? 7) _____

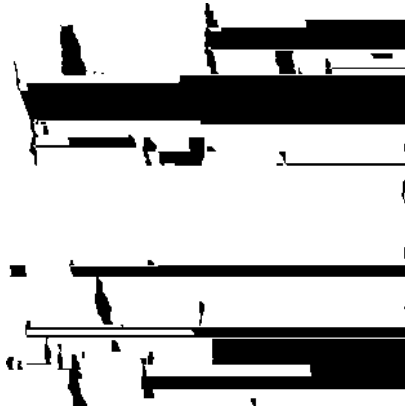
Give the answer rounded to two decimal places, if necessary.

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.

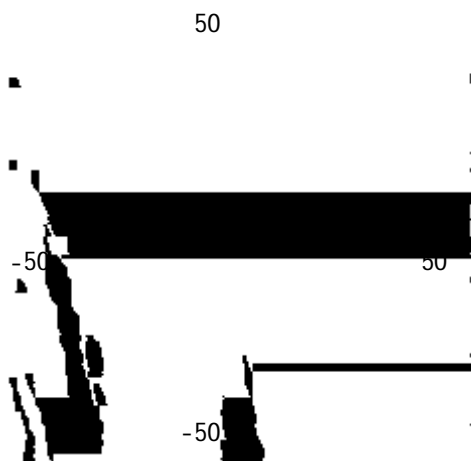
9) _____

- 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) $(-8, 0)$, $(1, 0)$

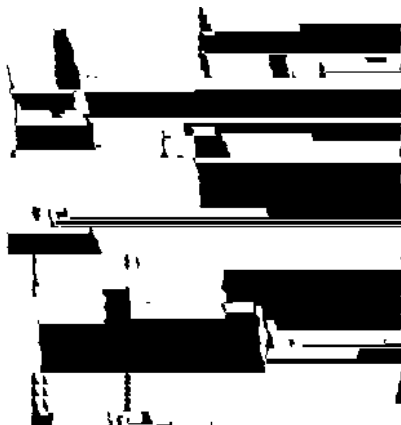
C) $(8, 0)$, $(-4, 0)$

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: $\{y | y \leq -9\}$

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

C) domain: $\{x | x \leq -1\}$
range: $\{y | y \leq 9\}$

D) domain: all real numbers
range: $\{y | y \leq 9\}$

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

16) _____

$P(x) = -0.004x^2 + 2.8x - 250$. Find the number of pretzels that must be sold to maximize profit.

A) 240 pretzels

B) 350 pretzels

C) 1.4 pretzels

D) 700 pretzels

Solve the inequality.

17) $x^2 + 3x \geq 0$

17) _____

A) $\{x | x \leq 0 \text{ or } x \geq 3\}; (-b, 0] \text{ or } [3, b)$

B) $\{x | -3 \leq x \leq 0\}; [-3, 0]$

C) $\{x | x \leq -3 \text{ or } x \geq 0\}; (-b, -3] \text{ or } [0, b)$

D) $\{x | 0 \leq x \leq 3\}; [0, 3]$

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

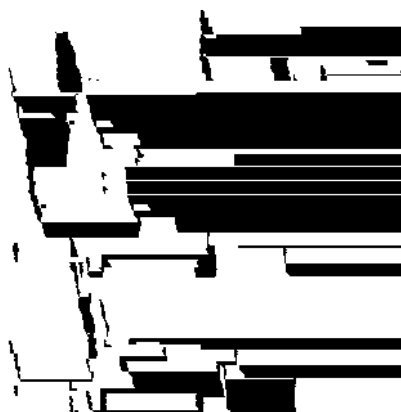
C) 3, multiplicity 1, touches x-axis; -1, multiplicity 3

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

Graph the function using transformations.

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

20) _____



A)



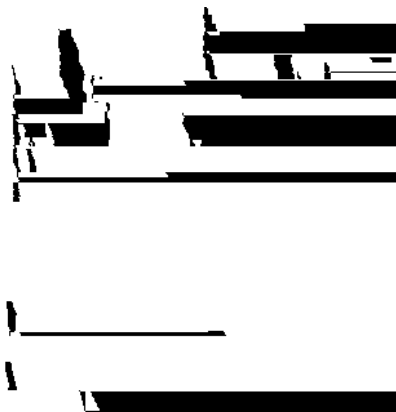
B)



C)



D)



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

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

21) _____

A) $y = 0$

B) $y = \frac{9}{8}$

C) $y = \frac{8}{3}$

D) none

Solve the inequality. Express the solution using interval notation.

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

22) _____

A) $(-7, 0) \text{ or } (2, b)$

B) $(-2, 0) \text{ or } (7, b)$

C) $(-2, b)$

D) $(-b, -2) \text{ or } (0, 7)$

Solve the equation in the real number system.

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

23) _____

A) $\{-1, 2\}$

B) $\left\{-\frac{5}{2}, \frac{5}{2}\right\}$

C) $\left\{-\frac{\sqrt{10}}{2}, \frac{\sqrt{10}}{2}\right\}$

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) $7 + 5i$