

QU-Placer Math Sample Test No. 1

Section 1: Elementary Algebra

Answer the following questions:

1. The sum of two negative numbers is always a

- (A) Negative number
 - (B) Positive number
 - (C) Even number
 - (D) Odd number
-

2. Which subset of real numbers contains $3\sqrt{2} + 1$?

- (A) Irrational Numbers
 - (B) Rational Numbers
 - (C) Integers
 - (D) Whole Numbers
-

3. Perform the indicated operations and write the answer in the simplest form

$$\left(-\frac{a b^2}{125} \div \frac{12 a^3 b}{25}\right) \times -\frac{75 a}{4 b^2} = \quad \text{where } a \neq 0, b \neq 0$$

- (A) $\frac{5}{16 a b}$
 - (B) $\frac{b^3}{1125 a^3}$
 - (C) $-\frac{9 a^5 b}{125}$
 - (D) $-\frac{5 a^2 b^2}{16 a^3 b^3}$
-

4. Evaluate $8 + 16 \div 4 \times 5 - 3$

- (A) 31
 - (B) 27
 - (C) 25
 - (D) 16
-

5. Evaluate $4 - 5 \cdot [5 - (4^2 - 2)]$

- (A) 9
 - (B) 13
-

- (C) 49
(D) 69

6. The statement “81 is the product of a number and three times the same number” is expressed by which of the following equations?

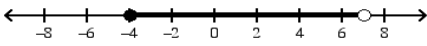
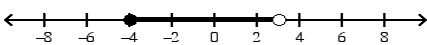
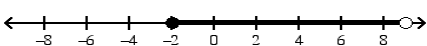
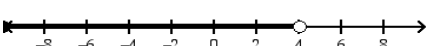
- (A) $81 = x(x + 3)$
(B) $81 = x \cdot 3x$
(C) $81 = 3x(x + 3)$
(D) $81 = 3x \cdot 3x$

7. The solution of the equation $3(x + 1) = x + 2$ is:

- (A) 2
(B) $\frac{1}{2}$
(C) -2
(D) $-\frac{1}{2}$

8. Which of the following represents the graph of the solution to the inequality

$$-12 \leq 2x - 4 < 10$$

- (A) 
(B) 
(C) 
(D) 

9. What is the leading coefficient in the polynomial $\frac{1}{9}x^3 - \frac{3}{2}x + 11$

- (A) $-\frac{3}{2}$
(B) $\frac{1}{9}$
(C) 3
(D) 11

10. The quotient and the remainder of $(x^5 + x^2 + x + 1) \div (x^2 - 1)$ are:

- (A) Quotient: $x^3 - x + 1$ Remainder: 2
(B) Quotient: $x^3 - 2$ Remainder: 3

- (C) Quotient: $x^3 + x + 1$ Remainder: $2x + 2$
(D) Quotient: $x^3 + 2x$ Remainder: $3x + 1$
-

11. Expand the binomial $(2x - 3)^3$
(A) $6x^3 - 36x^2 - 54x + 27$
(B) $6x^3 - 18x^2 + 27x - 27$
(C) $8x^3 - 36x^2 + 54x - 27$
(D) $8x^3 - 6x^2 + 6x - 27$
-

12. $x^3 - x^2 + x - 1$ is equivalent to:
(A) $(1 - x)(x^2 - 1)$
(B) $(x - 1)(x^2 - 1)$
(C) $(1 - x)(x^2 + 1)$
(D) $(x - 1)(x^2 + 1)$
-

13. $2x^2 + x - 3 =$
(A) $(2x + 1)(x - 3)$
(B) $(2x - 1)(x + 3)$
(C) $(2x + 3)(x - 1)$
(D) $(2x - 3)(x + 1)$
-

14. Factor completely $(4x^2 - 2x)$
(A) $x(4x^2 - 2)$
(B) $2(2x^2 - 2x)$
(C) $2x(2x - 1)$
(D) $4x(x - 1)$
-

15. Given that $\frac{x}{x+4} \div K = \frac{x-4}{2}$, which expression is equivalent to K ?

- (A) $\frac{2x}{x^2 - 16}$
(B) $\frac{x^2 - 16}{2x}$
(C) $\frac{2x^2}{x - 4}$
-

(D) $\frac{x-4}{2x^2}$

16. $\frac{8x+8y}{4} \cdot \frac{42}{48x+48y} =$

(A) $\frac{7}{4(x+y)}$

(B) $\frac{7(x+y)}{4}$

(C) $\frac{7}{32}$

(D) $\frac{7}{4}$

17. The Least Common Multiple of the polynomials $8x^2 - 6x - 9$ and $16x^2 - 9$ is:

(A) $(2x-3)(4x+3)^2(4x-3)$

(B) $(2x-3)(4x+3)(4x-3)$

(C) $(2x-3)(4x-3)^2$

(D) $(2x-3)(4x+3)^2$

18. Which of the following expressions is equivalent to $\frac{2\sqrt{x}}{3\sqrt{x}-2}$?

(A) $\frac{4x+4}{9x-4}$

(B) $\frac{4x}{9x-4}$

(C) $\frac{6x+4\sqrt{x}}{9x-4}$

(D) $\frac{6x-4\sqrt{x}}{9x-4}$

19. Simplify $\frac{(32x^{13}y^{18})^{\frac{1}{3}}}{(x^3y^3)^{\frac{1}{3}}}$

(A) $2xy \sqrt[3]{2xy}$

(B) $2xy \sqrt[3]{2x}$

(C) $2x^3y^5 \sqrt[3]{4xy}$

(D) $2x^3y^5 \sqrt[3]{4x}$

20. Simplify $5\sqrt{27} - 6\sqrt{3}$

- (A) $-\sqrt{30}$
- (B) $-\sqrt{24}$
- (C) $9\sqrt{3}$
- (D) $9\sqrt{6}$

21. What is the LCD (Least Common Denominator) of the equation

$$\frac{7}{x+2} + \frac{5}{x-2} = \frac{10x-2}{x^2-4}$$

- (A) $x^2 - 4$
- (B) $x^2 - 16$
- (C) $10x - 2$
- (D) $12x - 2$

22. The solution set of the inequality $2 \leq 4x + 6 < 8$ is:

- (A) $[-5\frac{1}{2}, -4]$
- (B) $[-4, 2]$
- (C) $[-4, 2)$
- (D) $[-1, \frac{1}{2})$

23. Which of the following equations has 2 and -10 as solutions?

- (A) $x^2 - 40x - 20 = 0$
- (B) $x^2 + 40x - 20 = 0$
- (C) $x^2 + 8x - 20 = 0$
- (D) $x^2 + 20 = 0$

24. For which value(s) of c does the equation $\sqrt{\sqrt{x} + 4} - \sqrt{c} = 0$ has a solution.

- (A) $c = -4$
 - (B) $c = 0$
 - (C) $0 < c < 4$
 - (D) $c \geq 4$
-

25. The solution set of the equation $x^4 - 2x^3 - x^2 + 2x = 0$ is

- (A) $\{-1, 0, 1, -3\}$
- (B) $\{-1, 0, 1, -2\}$
- (C) $\{-1, 0, 1, 3\}$
- (D) $\{-1, 0, 1, 2\}$

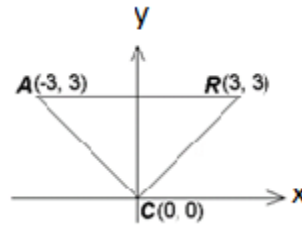
26. The solution set of the equation $\frac{18}{x-2} = 1 + \frac{20}{x+2}$ is

- (A) $\{-20, 10\}$
- (B) $\{8, -10\}$
- (C) $\{-8, 10\}$
- (D) $\{20, -10\}$

27. The solution set of the equation $|x^2 + 3x - 2| + |-5| = 7$ is

- (A) $\{-4, -3, -1, 0\}$
- (B) $\{-4, -3, 0, 1\}$
- (C) $\{-3, -2, 0, 2\}$
- (D) $\{-3, -1, 0, 4\}$

28. What is the value of the perimeter of triangle CAR?



- (A) $6 + 6\sqrt{2}$
- (B) $6 + 6\sqrt{3}$
- (C) $12 + 3\sqrt{2}$
- (D) 18

29. The midpoint between $A(-1, 3)$ and $B(2, a)$ is :

- (A) $(-3, 3 - a)$
- (B) $(1, 3 + a)$
- (C) $\left(-\frac{3}{2}, \frac{3 - a}{2}\right)$
- (D) $\left(\frac{1}{2}, \frac{3 + a}{2}\right)$

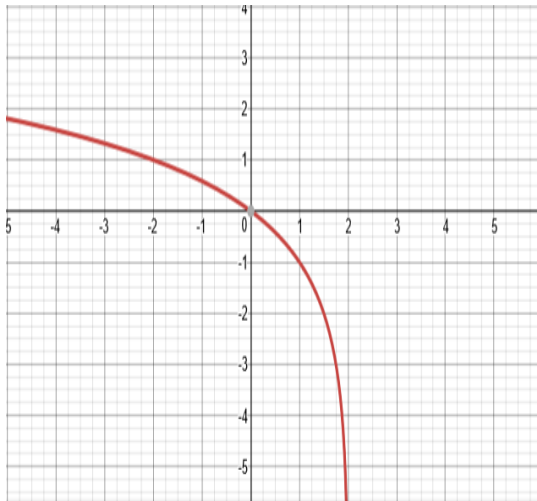
30. For the line $10x + 2y = 6$
- (A) The slope = -10 and y-intercept = 6
 - (B) The slope = -5 and y-intercept = 3
 - (C) The slope = 3 and y-intercept = -5
 - (D) The slope = 5 and y-intercept = 3

Section 2: Pre-Calculus

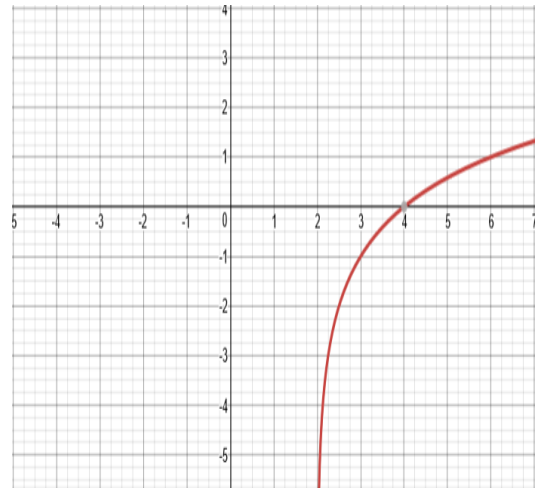
Answer the following questions:

31. Which of the following is the correct graph of $f(x) = \log_2(x - 2) - 1$?

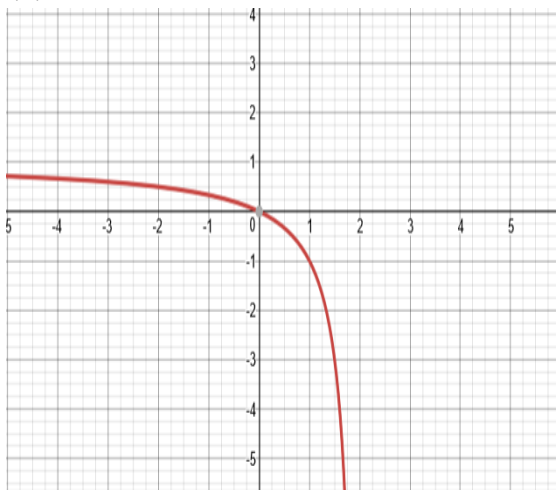
(A)



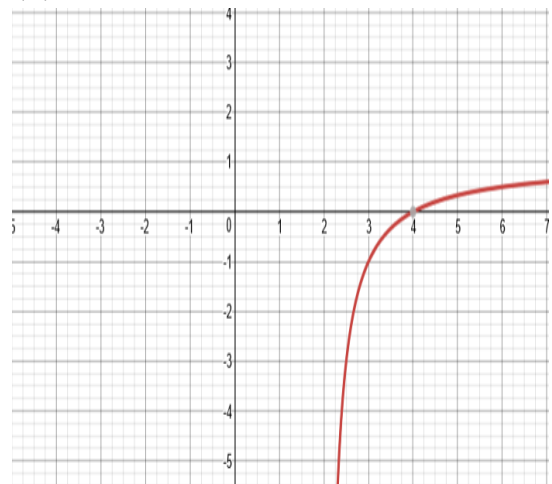
(C)



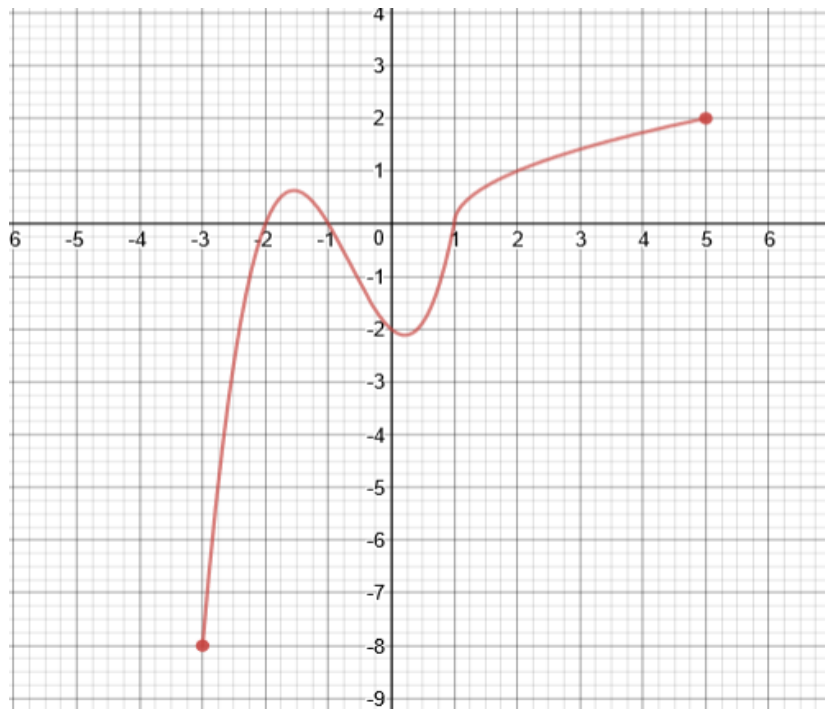
(B)



(D)



32. Using the graph of the function f shown to solve $f(x) > 0$



- (A) $[-2, -1] \cup [1, 5]$
- (B) $[-2, -1] \cup (1, 5)$
- (C) $(-2, -1) \cup (1, 5]$
- (D) $(-2, -1) \cup (1, 5)$

33. If $\sin \alpha = \cos \alpha$ and α is in the third quadrant, then α is equal to:

- (A) $\frac{\pi}{4}$
- (B) $\frac{7\pi}{6}$
- (C) $\frac{4\pi}{3}$
- (D) $\frac{5\pi}{4}$

34. The domain of $f(x) = \frac{\sqrt{x+1}}{x-2}$ is

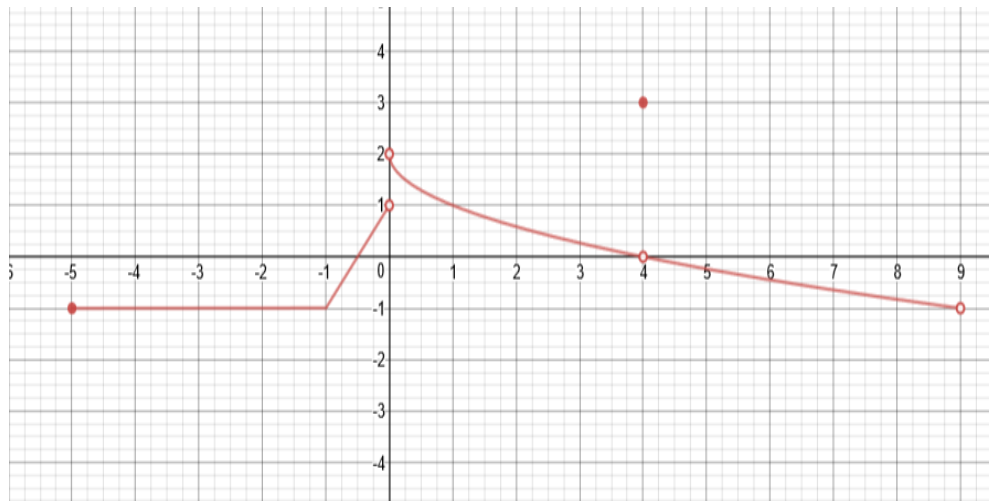
- (A) $[-1, \infty)$
- (B) $(-\infty, 2) \cup (2, \infty)$
- (C) $[-1, 2) \cup (2, \infty)$
- (D) $(-\infty, \infty)$

35. If $8^x = \left(\frac{1}{2}\right)^{2x-5}$ then $x =$
- (A) -5
 (B) -1
 (C) 1
 (D) 5

36. if $2^x - 3^{1-x} = 0$ then $x =$
- (A) $x = -\frac{\ln 3}{\ln 3 + \ln 2}$
 (B) $x = \frac{1}{\ln 3 + \ln 2}$
 (C) $x = -\frac{1}{\ln 3 + \ln 2}$
 (D) $x = \frac{\ln 3}{\ln 3 + \ln 2}$

37. State the domain of the relation $\{(-10, 9), (6, 0), (-5, 0)\}$.
- (A) Domain = $\{-10, -5, 0, 6, 9\}$
 (B) Domain = $\{-10, -5, 0, 6\}$
 (C) Domain = $\{-10, -5, 6\}$
 (D) Domain = $\{0, 9\}$

38. Given the graph of function $f(x)$, what is domain of $f(x)$?



- (A) $[-5, 9)$
 (B) $[-5, 0) \cup (0, 9)$
 (C) $[-5, 0) \cup (0, 4) \cup (4, 9)$
 (D) $[-5, 1) \cup (2, 4) \cup (4, 9)$

39. What is the range of the function $f(x) = \log_3(x^2 + 1)$?

- (A) $(0, \infty)$
- (B) $[0, \infty)$
- (C) $(1, \infty)$
- (D) $[1, \infty)$

40. Find the inverse of the function $f(x) = \sqrt{x-8}$

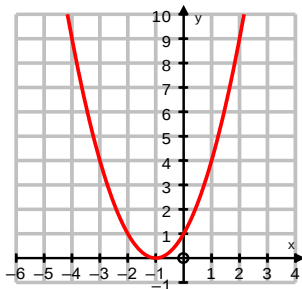
- (A) $f^{-1}(x) = x^2 + 8$ for $x \geq 8$
- (B) $f^{-1}(x) = x^2 + 8$ for $x \geq 0$
- (C) $f^{-1}(x) = x^2 + 8$ for any real number x
- (D) $f^{-1}(x) = \frac{1}{\sqrt{x-8}}$ for $x \geq 8$

41. If $\ln 2 = s$ and $\ln 3 = t$ then $\ln \sqrt[3]{24}$

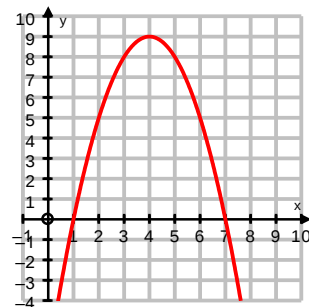
- (A) st
- (B) $\frac{st}{3}$
- (C) $s + \frac{t}{3}$
- (D) None of the above

42. Select the possible graph for the function $f(x) = -(x-m)(x-n)$, if $m > 0$ and $n > 0$

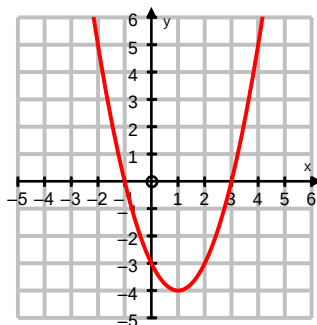
(A)



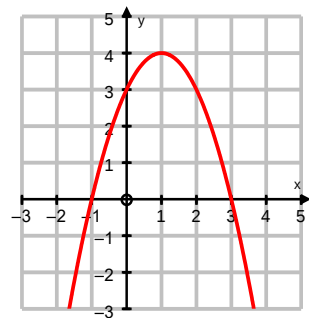
(B)



(C)



(D)



43. If $\log_x y = \frac{1}{2}$ then $\log_x x y^2 =$

- (A) 1
- (B) 2
- (C) 3
- (D) 4

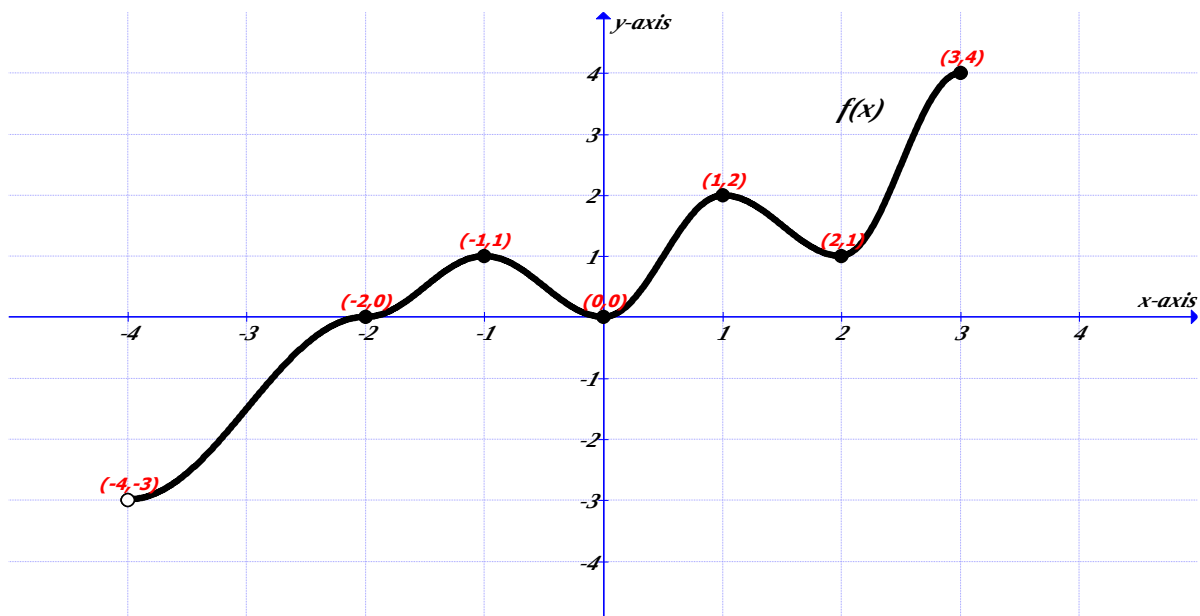
44. $-\frac{\cot^2 x}{1 - \csc x} =$

- (A) $\frac{1 + \cos x}{\cos x}$
- (B) $\frac{1 + \sin x}{\sin x}$
- (C) -1
- (D) 1

45. The graph of the function $g(x) = \frac{x^3 - x}{x^2 + 4}$ is :

- (A) Symmetric with respect to the origin
- (B) Symmetric with respect to the x - axis
- (C) Symmetric with respect to the y - axis
- (D) Symmetric with respect to the line $y = x$

46. List all the intervals on which the graph of $f(x)$ is decreasing.



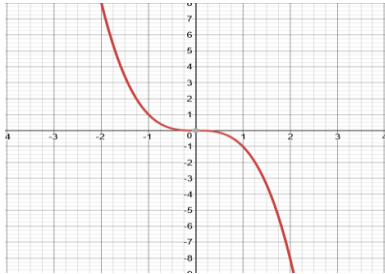
- (A) $(-1, 0), (1, 2)$
- (B) $(1, 2)$
- (C) $(1, 0), (2, 1)$
- (D) $(1, 0)$

47. If x & y angles are both in the third quadrant and $\sin x = -\frac{3}{5}$ and $\cos y = -\frac{\sqrt{3}}{2}$ Find $\cos(x + y)$
- (A) $\frac{-5\sqrt{3} - 10}{10}$
- (B) $\frac{4\sqrt{3} - 3}{10}$
- (C) $\frac{-5\sqrt{3} + 10}{10}$
- (D) $\frac{4\sqrt{3} + 3}{10}$
-
48. Given $f(x) = 2(x - 1)$ and $g(x) = x^2 + 1$, find the composite function defined by $(f \circ g)(x)$.
- (A) $2x^2$
- (B) $2x^2 - 2$
- (C) $4x^2 - 8x + 5$
- (D) $4x^2 + 8x + 5$
-
49. To obtain the graph of $g(x) = (x - 4)^2 + 3$, the graph of $f(x) = x^2$ must be shifted
- (A) right 4 units, up 3 units
- (B) right 4 units, down 3 units
- (C) left 4 units, up 3 units
- (D) left 4 units, down 3 units
-
50. Which angle is co-terminal with 300° angle?
- (A) 660°
- (B) 480°
- (C) 390°
- (D) 60°
-
51. The solution set to $1 - \cos^2 x = 0$ in interval $[0, 2\pi]$ is
- (A) $\{\frac{\pi}{2}, 2\pi\}$
- (B) $\{\frac{\pi}{2}, \pi\}$
- (C) $\{\frac{\pi}{2}, \pi, \frac{3\pi}{2}\}$
- (D) $\{0, \pi, 2\pi\}$
-
52. If $f(x) = x^2 - 2x + 3$ and $g(x) = |x - 3|$, then $\frac{f(0)}{g(1)} =$
- (A) $-\frac{3}{2}$
- (B) -1
- (C) $\frac{2}{3}$

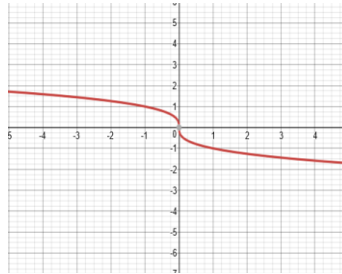
(D) $\frac{3}{2}$

53. The graph of the function $f(x) = \sqrt[3]{x}$ is

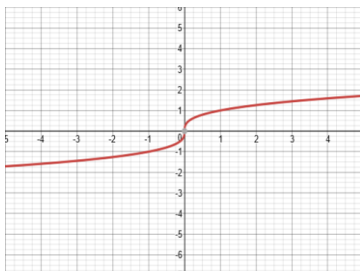
(A)



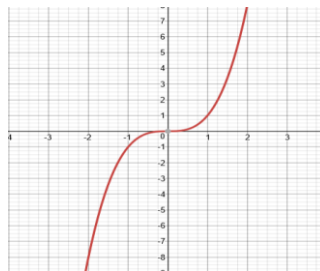
(B)



(C)



(D)



54. The function representing the following graph is



(A) $f(x) = 2^x - 2$

(B) $f(x) = -\frac{1}{x} + 1$

(C) $f(x) = \ln(x)$

(D) $f(x) = \frac{1}{x^2}$

55. If $\sin(x) = -\frac{4}{5}$ and $\cos(x) < 0$ then $\sin(2x) =$

- (A) $-\frac{24}{25}$
- (B) $-\frac{1}{25}$
- (C) $\frac{1}{25}$
- (D) $\frac{24}{25}$

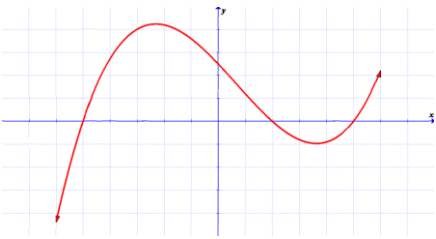
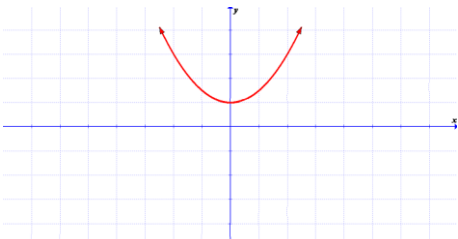
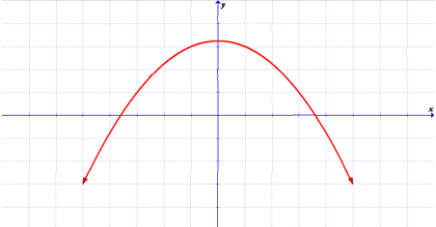
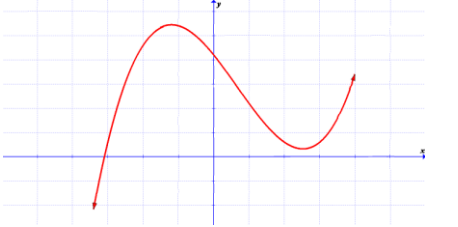
56. In which quadrants is $\tan x = \frac{\sin x}{\sqrt{1-\sin^2 x}}$

- (A) I, II
- (B) I, III
- (C) I, IV
- (D) All Quadrants

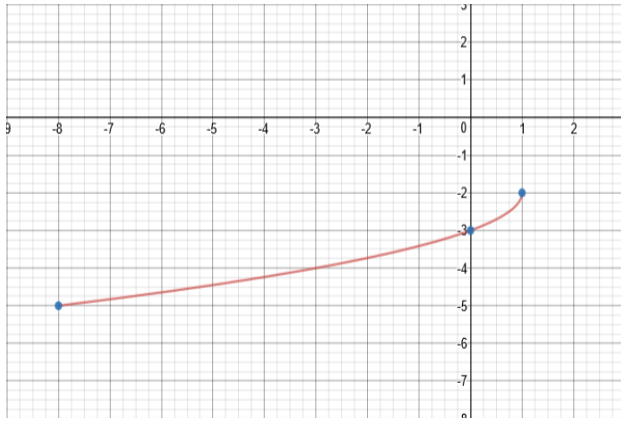
57. Which of the following functions is one to one?

- (A) $f(x) = x^3$
- (B) $f(x) = |x + 1|$ for $x \leq 0$
- (C) $f(x) = \ln|x|$
- (D) $f(x) = e^{x^2} + 1$

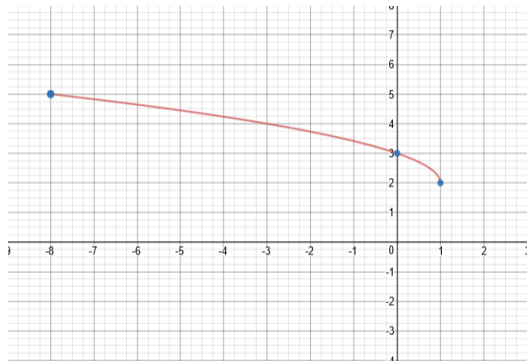
58. Using the given graphs, which of the functions has two real zeros?

- (A) 
- (B) 
- (C) 
- (D) 

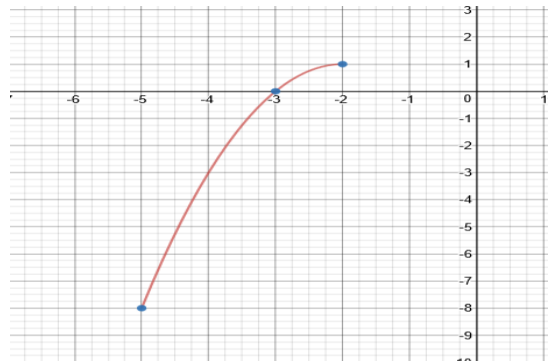
59. The graph of the inverse for the function graphed below is _____.



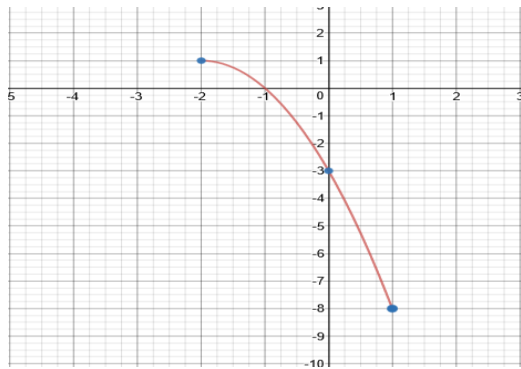
(A)



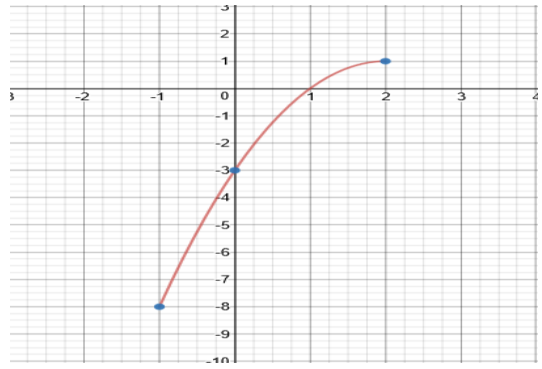
(B)



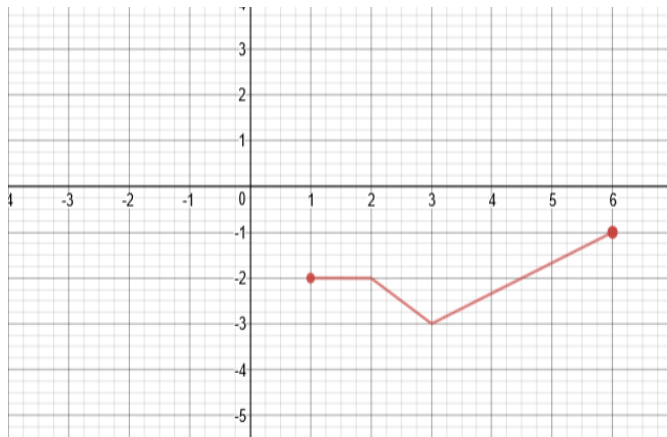
(C)



(D)

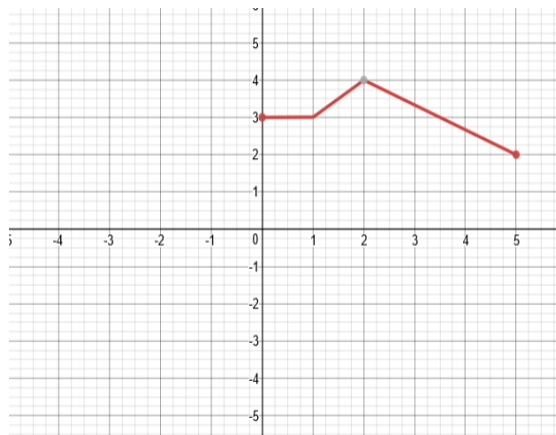


60. The graph of function f is given below

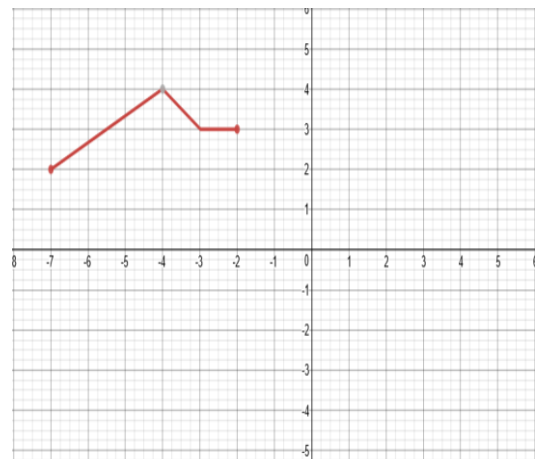


Which of the following is the graph of $(x) = 1 - f(x)$?

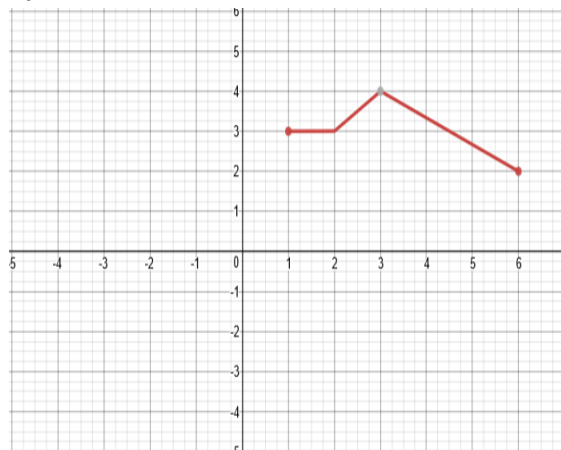
A)



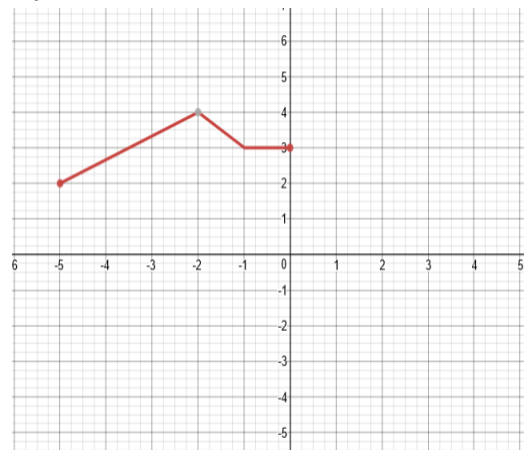
B)



C)



D)



Answer Key

Section 1

1. A
2. A
3. A
4. C
5. C
6. B
7. D
8. A
9. B
10. C
11. C
12. D
13. C
14. C
15. A
16. D
17. B
18. C
19. D
20. C
21. A
22. D
23. C
24. D
25. D
26. B
27. B
28. A
29. D
30. B

Section 2

31. C
32. C
33. D
34. C
35. C
36. D
37. C
38. B
39. B
40. B
41. C
42. B
43. B
44. B
45. A
46. A
47. B
48. A
49. A
50. A
51. D
52. D
53. C
54. C
55. D
56. C
57. A
58. C
59. B
60. C