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:

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

(A) $\dfrac{5}{16\,a\,b}$

(B) $\dfrac{b^3}{1125\,a^3}$

(C) $-\dfrac{9a^5b}{125}$

(D) $-\dfrac{5\,a^2b^2}{16\,a^3\,b^3}$

---

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) $-\frac{1}{2}$

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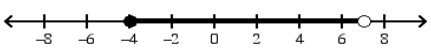
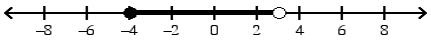
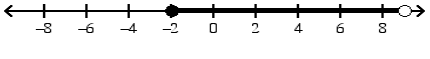
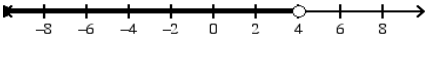
8. Which of the following represents the graph of the solution to the inequality $-12 \leq 2x - 4 < 10$?

(A) 

(B) 

(C) 

(D) 

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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 LCM (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) $\left[-1, \frac{1}{2}\right)$

---

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) $\{-3, -1, 0, 4\}$

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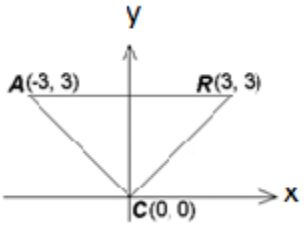
28. What is the value of the perimeter of triangle CAR?



(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 $= -5$

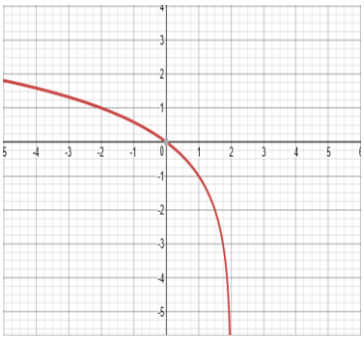
(D) The slope $= 5$ and y-intercept $= 3$

Section 2: Pre-Calculus

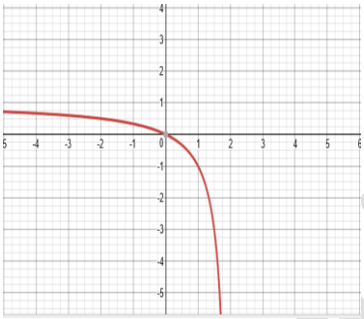
Answer the following questions:

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

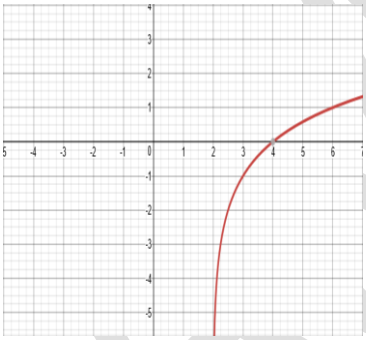
(A)



(B)



(C)



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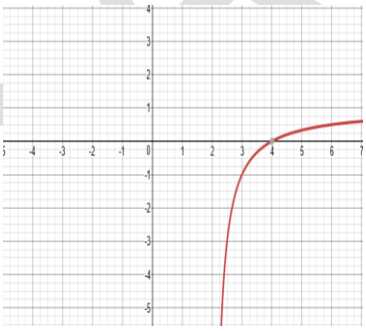
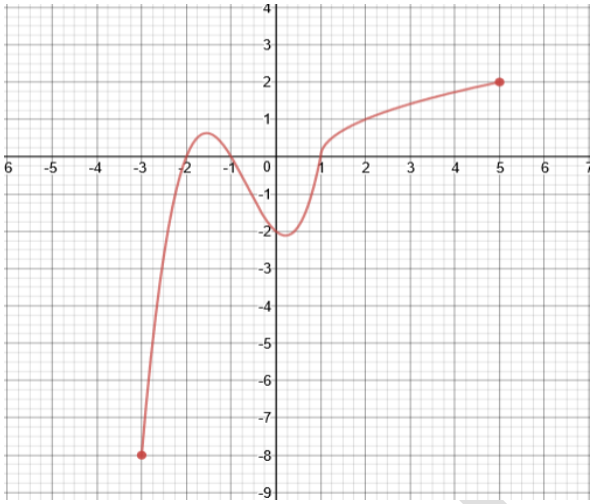


32. Using the graph of the function f shown below, solve $f(x) > 0$.



(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) $x = -\dfrac{\ln 3}{\ln 3+\ln 2}$

(B) $x = \dfrac{1}{\ln 3+\ln 2}$

(C) $x = -\dfrac{1}{\ln 3+\ln 2}$

(D) $x = \dfrac{\ln 3}{\ln 3+\ln 2}$

---

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}

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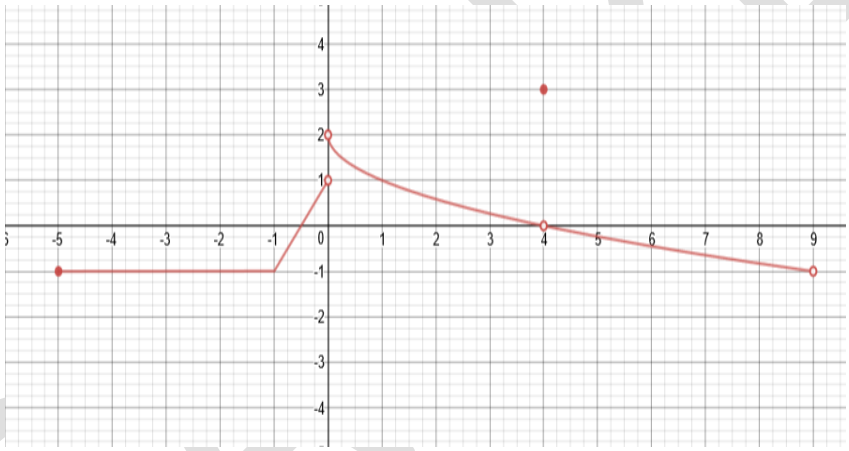
38. Given the graph of function $f(x)$, what is domain of $f(x)$?



(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) $f^{-1}(x) = \dfrac{1}{\sqrt{x-8}}$ for $x \geq 8$

---

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

(A) st

(B) $\dfrac{st}{3}$

(C) $s + \dfrac{t}{3}$

(D) None of the above

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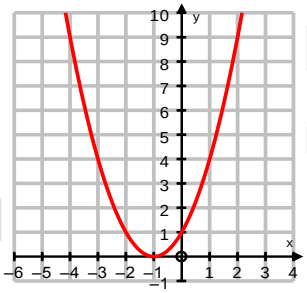
42. Select the possible graph for the function

$f(x) = -(x-m)(x-n)$, if $m > 0$ and $n > 0$

(A)



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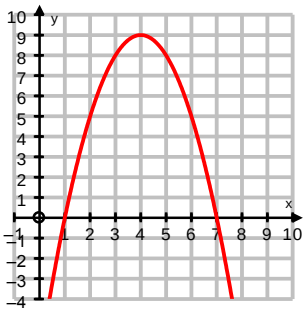
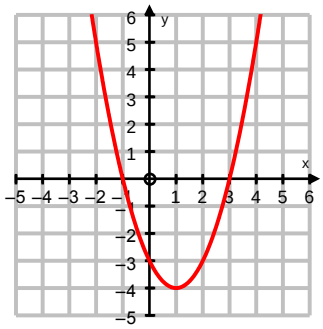


(C)



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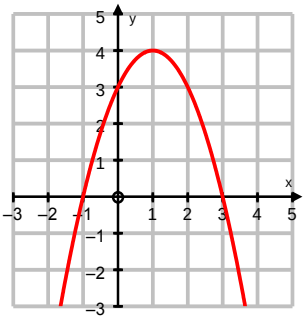

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43. If $\log_x y = \frac{1}{2}$ then $\log_x x\,y^2 =$ _____.

(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 $y = x$

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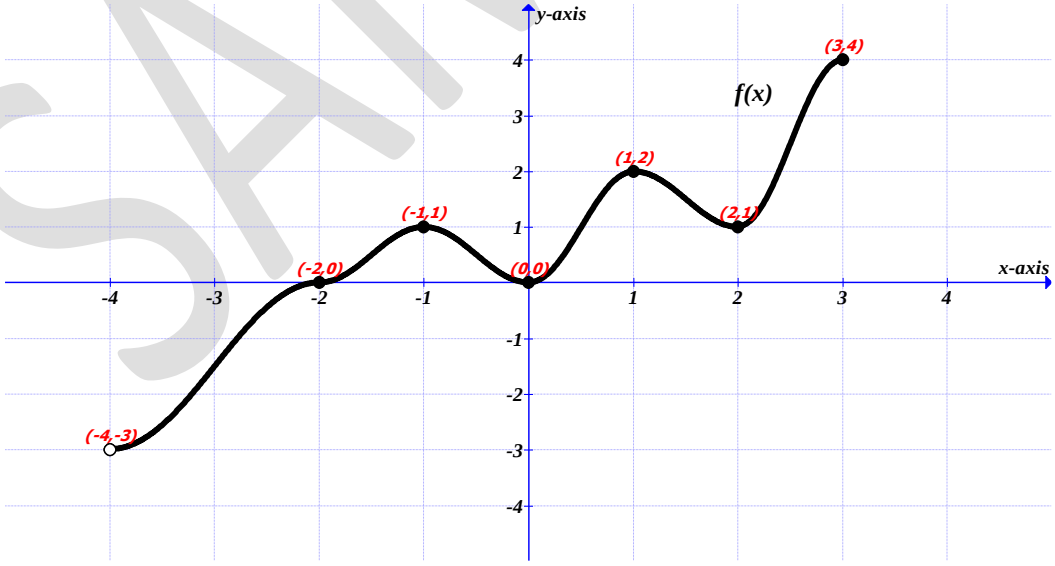
46. List all the intervals on which the graph of $f(x)$ is decreasing.



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

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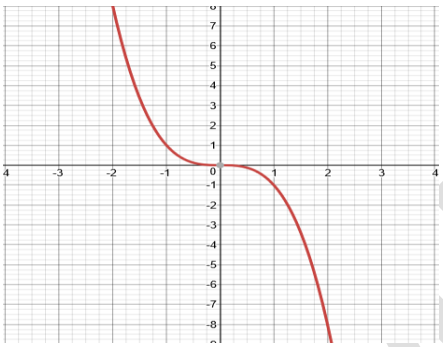
53. The graph of the function $f(x) = \sqrt[3]{x}$ is _____.

(A)



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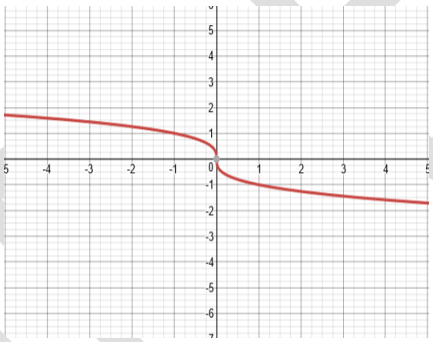

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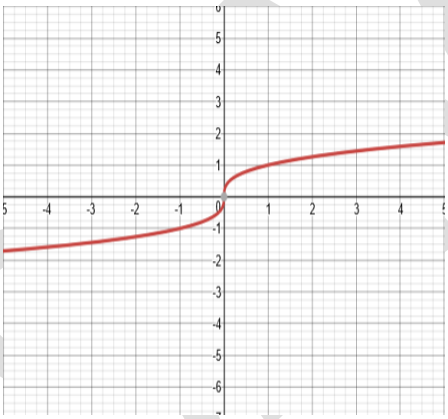

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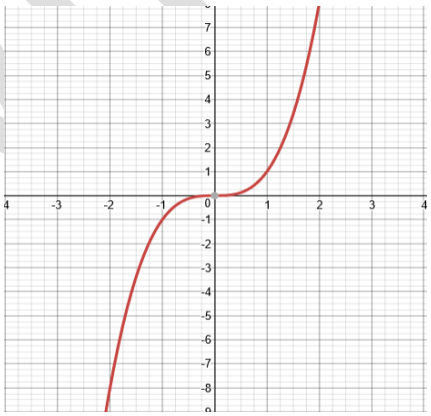

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54. The function representing the following graph is _____.

(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) $f(x) = e^{x^2} + 1$

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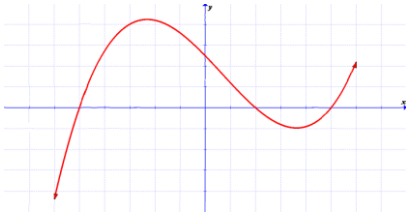
58. Using the given graphs, which of the functions has two real zeros?

(A)



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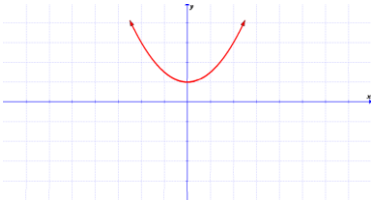

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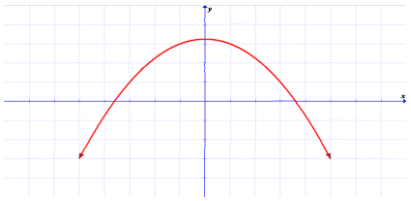

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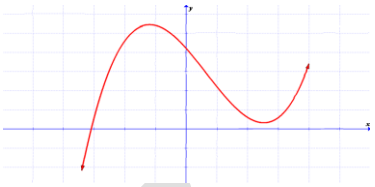

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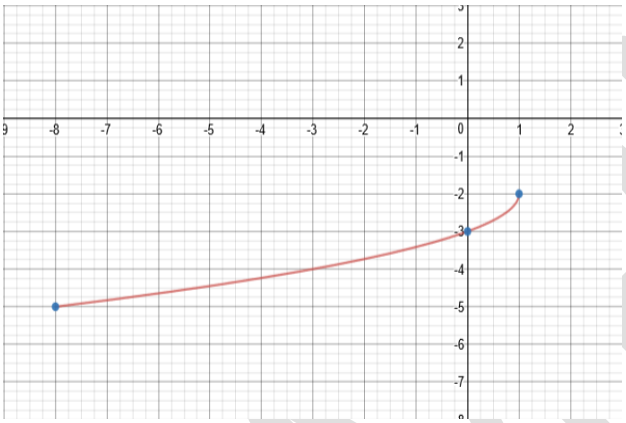
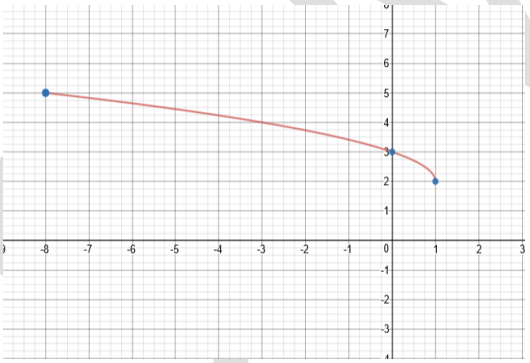
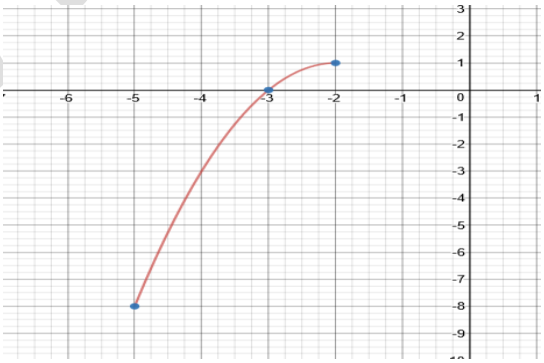
59. The graph of the inverse for the function graphed below is _____ .



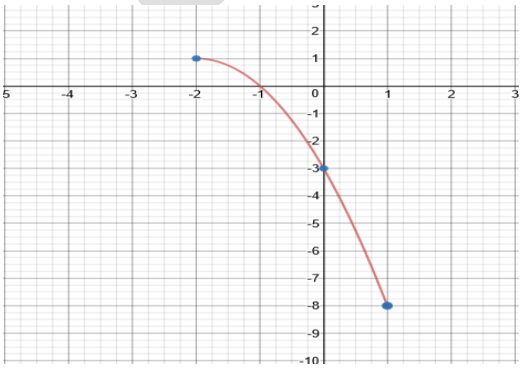
(A)



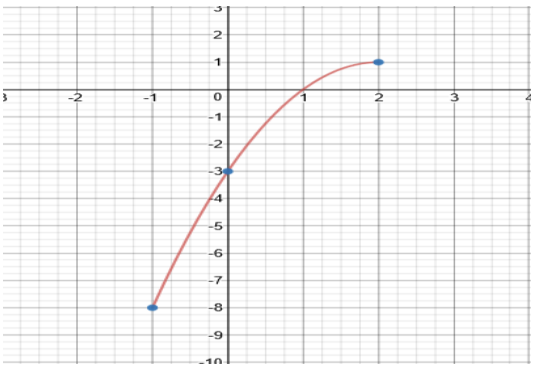
(B)



(C)



(D)



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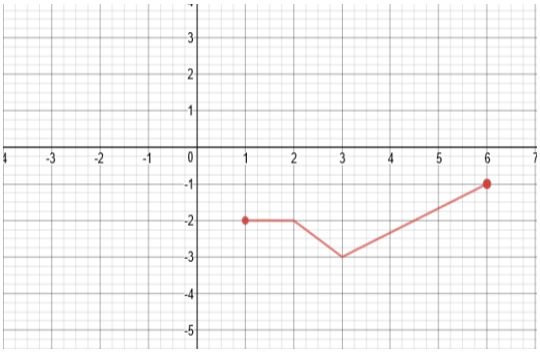
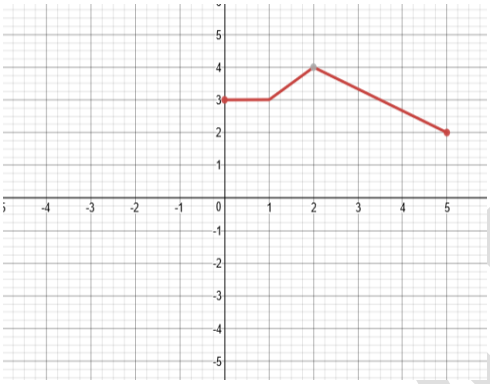
60. The graph of function f is given below

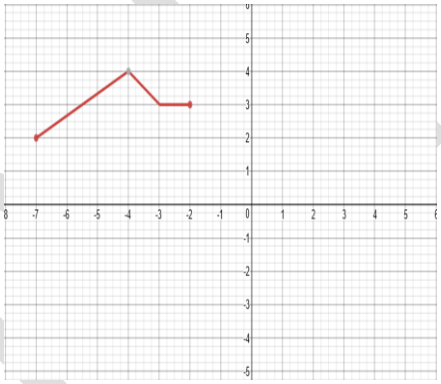


Which of the following is the graph of $(x) = 1 - f(x)$?

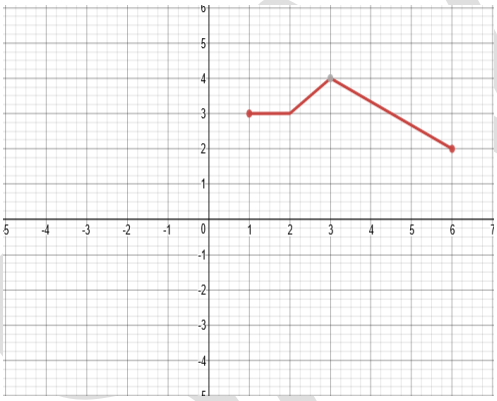
A)



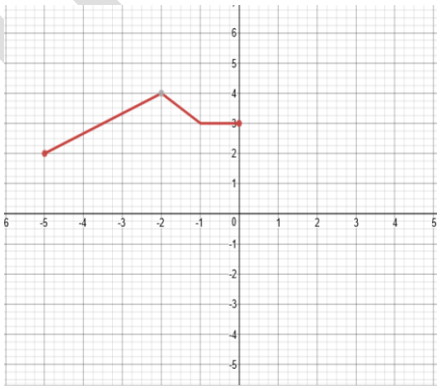
B)



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. D
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