

1) Which one of the following statements is TRUE about the function graphed below?

A) f is decreasing on the interval $(-2, 4)$

B) f is increasing on the interval $(-2, 4)$

C) $f(-2) = 5$

D) The domain of f is $(-2, 4) \cup (4, \infty)$

E) The range of f is the interval $(-6, 5)$

2) The line with x -intercept $\frac{1}{2}$ and parallel to the line $2x + 3y + 4 = 0$, is

A) $2x + 3y - 1 = 0$

B) $2x + 3y + 6 = 0$

C) $2x + 3y + 2 = 0$

D) $2x + 3y = 0$

E) $2x + 3y + 1 = 0$

3) The sum of all the solutions of the equation $16(x + 5)^{-\frac{2}{3}} - (x + 5)^{\frac{4}{3}} = 0$, is

- A) - 10
- B) 10
- C) 12
- D) 8
- E) - 14

4) If the area of the rectangle below is 21 square feet, then its perimeter in feet, is

- A) 19
- B) 30
- C) 20
- D) 17
- E) 32

5) The solution set of the inequality $\frac{x}{2} \geq \frac{2}{x}$, is

- A) $[-2, 0) \cup [2, \infty)$
- B) $(-\infty, -2] \cup (0, 2]$
- C) $(-\infty, -2] \cup [0, 2]$
- D) $[-2, 0] \cup [2, \infty)$
- E) $(-\infty, -1] \cup (1, \infty)$

6) The sum of all the solution(s) of the equation

$$\frac{4x}{x-5} - \frac{1}{x+1} = \frac{3x^2 + 3}{x^2 - 4x - 5}$$

- A) -2
- B) -3
- C) -1
- D) 2
- E) 3

7) Which one of the following represent y as a function of x ?

A) $2|x| + y = 0$

B) $2x + |y| = 0$

C) $\sqrt{y^2} - x^4 = 0$

D) $x = 1$

E) $x^2 + (y - 1)^2 = 4$

8) If $b > a$, then the distance between the points $(3a, -4b)$ and $(3b, -4a)$, is equal to

A) $5(b - a)$

B) $4(b + a)$

C) $3(b - a)$

D) $2(a - b)$

E) $b - a$

- 9) The solution set of the equation $\sqrt{3x + 1} = 2 + \sqrt{x + 1}$, has
- A) one positive integer only.
 - B) two positive integers.
 - C) one positive and one negative integers.
 - D) two negative integers.
 - E) one negative integer only.
- 10) If the quadratic equation $3x^2 + kx + 3 = 0$, has two distinct (different) real solutions, then the set of all values of k is
- A) $(-\infty, -6) \cup (6, \infty)$
 - B) $(-\infty, -2) \cup (3, \infty)$
 - C) $(-\infty, -3) \cup (3, \infty)$
 - D) $(-6, 6)$
 - E) $(-3, 3)$

11) Let $k > 0$. If the line through the points $(-5, -3)$ and $(-3, k)$ is perpendicular to the line $kx + (2k + 3)y = 5$, then $k =$

- A) 3
- B) 1
- C) 4
- D) 2
- E) 5

12) If $x \leq -\frac{1}{2}$, then the solution set of the inequality $|2x - 1| \geq |x^2 - 2x|$, is

- A) $[-1, -\frac{1}{2}]$
- B) \emptyset
- C) $[-2, -1]$
- D) $(-\infty, -1]$
- E) $(-\infty, -\frac{1}{2}]$

- 13) The graph of the equation $xy^2 = |x^4 - y^2|$, is
- A) symmetric with respect to the x -axis only
 - B) not symmetric with respect to the x -axis, y -axis, nor to the origin
 - C) symmetric with respect to the x -axis and y -axis
 - D) symmetric with respect to the y -axis only
 - E) symmetric with respect to the origin only

14) If $f(x) = \begin{cases} \sqrt{(1 - 5x)^2}, & \text{if } x < 2 \\ \lfloor 2x + 1 \rfloor, & \text{if } x \geq 2 \end{cases}$, then $f(\pi) + f(1) =$

- A) 11
- B) 7
- C) -4
- D) $5\pi + 2$
- E) $2\pi + 5$

15) Let f be a linear function such that $f(-3) = \frac{1}{2}$ and $f(1) = \frac{5}{2}$, then $f(7) =$

A) $\frac{11}{2}$

B) 5

C) $\frac{13}{2}$

D) $\frac{7}{3}$

E) 6

16) The standard form of the complex number $\frac{2 - 3i}{1 - 2i} + \frac{\sqrt{-36}}{\sqrt{-4} \sqrt{-9}}$, is

A) $\frac{8}{5} - \frac{4}{5}i$

B) $\frac{3}{5} + \frac{4}{5}i$

C) $\frac{1}{5} - \frac{2}{5}i$

D) $\frac{4}{5} - \frac{3}{5}i$

E) $\frac{6}{5} + \frac{4}{5}i$

17) An equation of the circle centred at $(-1, b)$ in the graph below, is

A) $x^2 + y^2 + 2x - 4y - 20 = 0$

B) $x^2 + y^2 + 2x + 4y + 20 = 0$

C) $x^2 + y^2 + 2x + 4y - 20 = 0$

D) $x^2 + y^2 + 2x - 4y + 20 = 0$

E) $x^2 + y^2 - 2x - 4y - 20 = 0$

18) The sum of distinct solutions of the equation $\sqrt[4]{x^3 + 6x^2} = x$,
is

A) 3

B) 2

C) -2

D) 1

E) -3

19) The solution set of the inequality $-\frac{1}{2} \leq \frac{4-3x}{5} \leq \frac{1}{4}$, is

A) $\left[\frac{11}{12}, \frac{13}{6}\right]$

B) $\left[\frac{5}{12}, \frac{5}{6}\right]$

C) $\left[\frac{13}{12}, \frac{13}{6}\right]$

D) $\left[\frac{11}{10}, \frac{13}{5}\right]$

E) $\left[\frac{13}{6}, \frac{11}{5}\right]$

20) The domain of the function $f(x) = \frac{x-3}{x^2-x-6}$, is

A) $(-\infty, -2) \cup (-2, 3) \cup (3, \infty)$

B) $(-\infty, \infty)$

C) $(-\infty, -3) \cup (-3, 2) \cup (2, \infty)$

D) $(-\infty, 3) \cup (3, \infty)$

E) $(-\infty, -2) \cup (-2, \infty)$