1) The sum of all the solutions of the equation $(x - 2)^2 = x$, is

A) 5

B) - 5

C) 3

D) 6

E) - 1

2) Which one of the following equations represents y as a function of x ?

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

B) $x = 1$

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

D) $\sqrt{y^2} - |x| = 6$

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

3) If $(-2, 4)$ is a point on the circle $(x-4)^2 + (y+4)^2 = C$, then the radius of the circle is

A) 10

B) 12

C) 6

D) 100

E) 8

4) The domain of the rational expression $\dfrac{x-2}{x^2+x-6}$, is

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

B) $(-3, 2)$

C) $\{-3, 2\}$

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

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

5) If $(6, 8)$ is the midpoint of the line segment with endpoints $(a + 1, 2)$ and $(3, b - 1)$, then $a + b =$

A) 23

B) - 1

C) - 4

D) 7

E) 14

6) The sum of all the solutions of the equation $\left|\left|x + 3\right| - 5\right| = 2$, is

A) - 12

B) 5

C) - 5

D) - 6

E) 4

7) If $z = \sqrt{-10}\sqrt{-40} + \left(\frac{1-i}{1+i}\right)^{101} = a + bi$, then $a + b =$

A) -21

B) 19

C) -20

D) -19

E) 0

8) If $-2+i$ and $-2-i$ are the solutions of the equation $x^2 + bx + c = 0$, then $b + c =$

A) 9

B) 0

C) 5

D) 4

E) 1

9) The graph of the equation $xy = |x - y|$, is

A) symmetric with respect to the origin only

B) symmetric with respect to the y-axis only

C) symmetric with respect to the x-axis and the y-axis

D) symmetric with respect to the x-axis only

E) not symmetric with respect to the x-axis, the y-axis, nor the origin

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

A) -1

B) $t - 1$

C) 1

D) $1 - t$

E) 2

11) The number of all the solutions of the equation $\left(1+\sqrt{x}\right)^2 - \left(1+\sqrt{x}\right) - 2 = 0$, is

A) 1

B) 0

C) 2

D) 4

E) 3

12) The sum of all the x-intercepts of the equation $y = x^3 + 3x^2 - x - 3$ is

A) - 3

B) 2

C) - 5

D) 4

E) 0

13) If $f(x) = \begin{cases} \sqrt{(1 - 5x)^2} & , \text{ if } x < 2 \\ [\![2x + 1]\!] & , \text{ if } x \geq 2 \end{cases}$, where $[\![\ ]\!]$ is the greatest integer function, then $f(\pi) + f(1) =$

A) 11

B) $2\pi + 5$

C) -4

D) 7

E) $5\pi + 2$

14) If the points $(7, a)$ and $(3, a + 4)$ are at the same distance from the origin, then $2a - 1 =$

A) 5

B) 0

C) 13

D) -5

E) -1

15) If the lines with equations $kx + 2y - 7 = 0$ and $(k - 1)x - y + 1 = 0$, are perpendicular, then the sum of all values of k is

A) 1

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

C) 2

D) - 1

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

16) The graph of the function $f(x) = \begin{cases} x + 3, & \text{if } x \le 0 \\ 1 - x, & \text{if } x > 0 \end{cases}$, is decreasing on the interval

A) $(0, \infty)$

B) $(-1, \infty)$

C) $(-\infty, 0)$

D) $(-\infty, 1)$

E) $(-3, 1)$

17) The solution of the inequality $\frac{1+x}{1-x} \geq 1$, is

A) $[0, 1)$

B) $(-\infty, 0] \cup (1, \infty)$

C) $(0, 1)$

D) $[-1, 1]$

E) $[-1, 0) \cup (1, \infty)$

18) The equation $\frac{8x}{x+1} - \frac{8x}{x-1} = \frac{-16}{x^2-1}$, has

A) no solution

B) one positive real solution only

C) two positive real solutions

D) two negative real solutions

E) one negative real solution only

19) The equation of the line passing through the center of the circle $x^2 + y^2 - 4x + 2y - 20 = 0$, and parallel to the tangent line of the same circle at the point $(6, -4)$, is

A) $4x - 3y - 11 = 0$

B) $x - y + 1 = 0$

C) $3x + 4y - 2 = 0$

D) $3x + 4y + 2 = 0$

E) $4x - 3y + 11 = 0$

20) The solution of the inequality $\frac{1}{\sqrt[4]{(2x - 3)^4}} \geq \frac{1}{5}$, is

A) $[-1, \frac{3}{2}) \cup (\frac{3}{2}, 4]$

B) $(-\infty, -1] \cup [4, \infty)$

C) $[-1, \frac{1}{2}) \cup (\frac{3}{2}, 4]$

D) $[-1, 4]$

E) $[-1, \frac{3}{2}) \cup (\frac{3}{2}, \infty)$