1) If $3x = (2x - 1)(m + 4)$, then $x =$

    A) $\dfrac{m + 4}{2m + 5}$

    B) $\dfrac{m + 4}{2m - 5}$

    C) $\dfrac{m - 4}{2m - 5}$

    D) $\dfrac{m - 4}{m + 5}$

    E) $\dfrac{m - 4}{m - 5}$

2) Which one of the following statements is TRUE?

    A) $-3(3x + 7) = -9x - 7$ is a contradiction

    B) $\dfrac{x + 4}{x - 4} = -1$ is an identity

    C) $x^2 = 4$ and $x + 2 = 4$ are equivalent equations

    D) $\dfrac{1}{2}(6x + 20) = x + 4 + 2(x + 3)$ is a conditional equation

    E) $(x + 3)^2 = x^2 + 9$ is an identity

3) If the width of a rectangle is 30 meters less than twice the length of the rectangle and if the perimeter of the rectangle is 180 meters, then the length of the rectangle is equal to

A) 40

B) 58

C) 14

D) $\dfrac{50}{3}$

E) 33

4) The solution set, in interval notation, of the inequality $- 2\left| 2x + 5 \right| + 7 \geq 1$ is :

A) $[- 4, - 1]$

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

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

D) $[1, 4]$

E) $(- \infty, - 2] \cup [3, \infty)$

5) If the equation $3x^2 - 2x + 4 = 0$ is written in the form $(x - a)^2 = b$, then $a + b =$

A) $-\dfrac{8}{9}$

B) $\dfrac{14}{9}$

C) $\dfrac{1}{3}$

D) $-\dfrac{4}{3}$

E) $\dfrac{1}{9}$

6) The solution set of the equation $x^2 - \sqrt{5}\,x - 1 = 0$, consists of

A) One positive and one negative irrational numbers

B) Two positive irrational numbers

C) Two positive rational numbers

D) One positive and one negative rational numbers

E) Two nonreal complex numbers

7) If $x = k$ is the solution of the equation $\dfrac{x}{x+2} + \dfrac{3x+1}{x} = \dfrac{2}{x^2+2x}$,

then $4k + 1$ is equal to :

A) - 6

B) 1

C) -9

D) 3

E) - 3

8) The solution set of the inequality $\dfrac{x}{x+2} \geq \dfrac{1}{x+2}$ is

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

B) $[1, \infty)$

C) $(-\infty, -2] \cup (1, \infty)$

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

E) $(-\infty, 1] \cup [2, \infty)$

9) The domain of the function $f(x) = \dfrac{x^2 - 3x}{x - 3}$ is given by

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

B) $(-\infty , 2] \cup (3, \infty)$

C) $(-\infty , 0) \cup (0, 3) \cup (3, \infty)$

D) $[0, 3)$

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

10) The number of solutions of the equation $\left| x^2 - 2 \right| = \left| x \right|$ is

A) 4

B) 1

C) 2

D) 5

E) 3

11) If $(a, 0)$ is the x-intercept and $(0, b)$ is the y-intercept of the graph of $y = \sqrt[3]{x + 8}$, then $a + b =$

  A) - 6

  B) 3

  C) - 4

  D) 5

  E) 0

12) If the line through the points $(2, 6)$ and $(-4, k)$ is perpendicular to the line $2x - 3y = 4$, then $k =$

  A)   15

  B)   16

  C)   20

  D) -20

  E) - 16

13) The sum of all real solutions of the equation $(x - 2)^{\frac{2}{3}} = (x)^{\frac{1}{3}}$ is

A) 5

B) – ™

C) 6

D) 3

E) - 2

14) The solution set of the inequality $x^3 - 16x \le 0$ is

A) $(-\infty , -4] \cup [0, 4]$

B) $(-\infty , 0] \cup [4, \infty)$

C) $(-\infty , -4) \cup (0, 4)$

D) $(-\infty , -4] \cup [-3, 4]$

E) $[-4, 3] \cup [4, \infty)$

15) The equation of the circle given in the figure below is

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

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

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

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

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

16) If $M(-2, s)$ is the midpoint of the line segment from $P(t, 2)$ to $Q(-5, 3)$, then $s + t =$

A) $\dfrac{7}{2}$

B) $\dfrac{9}{2}$

C) $\dfrac{3}{2}$

D) $\dfrac{1}{2}$

E) 1

17) If (h, k) is the center and r is the radius of the circle

$2x^2 + 2y^2 - 6x + 10y - 1 = 0$, then $h + k + r =$

A) 2

B) 6

C) 5

D) 4

E) 3

18) Which one of the following statements is TRUE about the graph below?

A) f is decreasing over the interval $(-\infty, 2)$

B) f is decreasing over the interval $(-\infty, 4)$

C) f is decreasing over the interval $[2, 4]$

D) f is increasing over the interval $(-\infty, 0)$

E) f is constant over the interval $[2, 4]$

19) The equation of the line passing through (-2, 5) with y-intercept $-\dfrac{5}{2}$ is :

  A) $15x + 4y + 10 = 0$

  B) $3x - 2y + 16 = 0$

  C) $5x + 3y - 5 = 0$

  D) $12x + 5y - 1 = 0$

  E) $10x - 3y + 25 = 0$

20) For the function $f(x) = \begin{cases} [\![\, x - 1 \,]\!] & \text{if} \quad x > 0 \\ |\, 2x - 5 \,| & \text{if} \quad x \le 0 \end{cases}$,

  where $[\![\ ]\!]$ is the greatest integer function, then $f(\pi) - f(-1/2) =$

  A) -4

  B) 3

  C) -2

  D) 4

  E) -3