1) The domain of the expression $\frac{(x - 2)(x - 4)}{x^2 - 5x + 4}$ is

A) $(-\infty, 1) \cup (1, 4) \cup (4, \infty)$

B) $(-\infty, 2) \cup (2, 4) \cup (4, \infty)$

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

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

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

2) $\frac{2}{x} - \frac{x^2 - 1}{(x + 1)(x - 3)} \div \frac{x^2 - x}{x - 3} =$

A) $\frac{1}{x}$

B) $\frac{2}{x(x + 1)^2}$

C) 1

D) $\frac{x + 1}{x - 3}$

E) $\frac{x(x - 1)^2}{x - 3}$

3) $\frac{x+y}{x-y} \cdot \frac{x^{-1}y - xy^{-1}}{x^{-1}+y^{-1}} =$

A) $-x-y$

B) $-x+y$

C) $x+y$

D) $x-y$

E) -1

4) If $\frac{1}{2}$ is a solution of the equation $3x - \frac{kx}{2} = \frac{x+1}{3} - \frac{1}{4}$, then $k =$

A) 5

B) 6

C) $\frac{17}{3}$

D) $-\frac{17}{3}$

E) -4

5) The sum of the solution set of the equation $(x + 1)^{\frac{2}{3}} = 4$ is

A) - 2

B) - 9

C) 7

D) - 7

E) 3

6) If $\frac{1}{w} = \frac{1}{x} + \frac{1}{y}$, then $x =$

A) $\frac{wy}{y - w}$

B) $\frac{wy}{w - y}$

C) $w - y$

D) $y - w$

E) $\frac{w - y}{wy}$

7) If (m, n) is the midpoint of the line joining the x-intercept and y-intercept of the graph of $y = -\sqrt{x+1}$, then $m + n =$

A) -1

B) 0

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

D) $-\frac{1}{4}$

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

8) If $y < x$, then the distance between the points $(\sqrt{3}x, y)$ and $(\sqrt{3}y, x)$ is equal to

A) $2(x - y)$

B) $2(y - x)$

C) $3(y - x)$

D) $3(x - y)$

E) $4(y - x)$

9) If the graph of the circle $2x^2 + 2y^2 - 8x + 4y = 0$ has center (h, k) and radius r, then $h + k + r^2 =$

A) 6

B) 4

C) $\sqrt{5} + 1$

D) $\sqrt{5} - 1$

E) 2

10) If the graph of the circle $(x + 2)^2 + (y - 3)^2 = k - 1$ is tangent to the y-axis, then $k =$

A) 5

B) 3

C) 8

D) 10

E) 7

11) The equation $|x - y| = y^2 + 1$ is

A) symmetric with respect to the origin only

B) symmetric with respect to the x-axis only

C) symmetric with respect to the y-axis only

D) symmetric with respect to the x-axis, y-axis and origin

E) not symmetric with respect to the x-axis, y-axis and origin

12) If $ax + by + c = 0$ is the equation of the line that passes through the point $(-1, 4)$ and parallel to the line $3x + 2y - 6 = 0$, then $(a \cdot b) + c =$

A) 1

B) 8

C) - 3

D) - 11

E) - 20

13) If slope of the line passing through the points $(k, -3)$ and $(-\frac{1}{2}, -2k)$ is $\frac{2}{3}$, then $4k =$

A) 10

B) 5

C) - 10

D) - 5

E) 8

14) In the adjacent figure, if $Ax - By = -36$ represents the equation of LINE 1 that is tangent to the circle $(x + \frac{1}{3})^2 + (y + \frac{1}{4})^2 = 3$, then $A + B =$

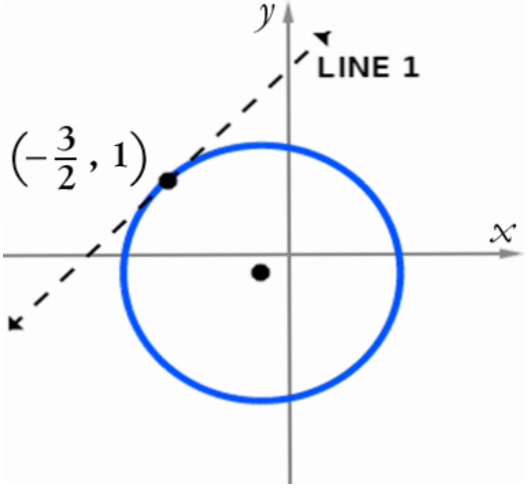
A) 29

B) - 1

C) 1

D) 24

E) 36



15) If the quadratic equation $kx^2 - (k - 3)x + 1 = 0$ has two equal solutions, then one possible value of k, is

A) 9

B) - 1

C) - 9

D) - 10

E) 10

16) If 4 is the sum and 1 is the product of the solutions of the equation $2x^2 + bx + c = 0$, then $b + c$ =

A) - 6

B) - 10

C) 10

D) 6

E) 4

17) If the equation $(\sqrt{2}\,x + 1)(\sqrt{2}\,x - 1) + 6x = 1$ is written in the form $(x - a)^2 = b$, then $a + b =$

A) $\frac{7}{4}$

B) $\frac{19}{4}$

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

D) $\frac{3}{4}$

E) $\frac{\sqrt{13}}{4}$

18) The sum of the real and imaginary parts of the complex number $(1 - 2i)\left(\sqrt{-4} - \sqrt[3]{-27}\right) + i^{11}$, is equal to

A) 2

B) 4

C) 8

D) 10

E) 12

19) The conjugate of the complex number $(2 - 3i)^{-1}$ is

A) $\frac{2}{13} - \frac{3}{13}i$

B) $\frac{2}{13} + \frac{3}{13}i$

C) $\frac{1}{2} + \frac{1}{3}i$

D) $\frac{1}{2} - \frac{1}{3}i$

E) $-\frac{2}{5} + \frac{3}{5}i$

20) If $a \pm bi$ are the nonreal complex solutions of the equation $x^3 + 1 = 0$, then $a \cdot b =$

A) $\frac{\sqrt{3}}{4}$

B) 1

C) $\frac{\sqrt{3}}{2}$

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

E) $\frac{1}{4}$