1) If $P(a, b)$ is a point on the curve $y = x^2$ that is $\sqrt{5}$ units from the point $Q(0, 3)$, then a **possible** value of $a + b$ is equal to

A) 6

B) -2

C) 20

D) -4

E) 16

2) The line that passes through the center of the circle $2x^2 + 2y^2 + 3x - y = 0$ and **perpendicular** to the x–axis , is

A) $4x + 3 = 0$

B) $4x - 3 = 0$

C) $2x + 3 = 0$

D) $4y - 1 = 0$

E) $2y - 3 = 0$

3) In the adjacent figure, the lines SQ and PR are the horizontal and vertical diameters of the circle $(x-3)^2+(y+2)^2=16$. If the point $M(a,b)$ is the **midpoint** of the line segment PQ, then $a+b=$

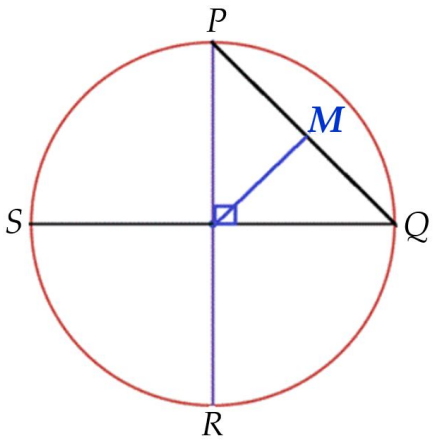
A) 5

B) 3

C) 7

D) 10

E) $4\sqrt{2}$



4) The equation of the circle with center $(3,-1)$ and **tangent** to the x–axis is

A) $x^2+y^2-6x+2y+9=0$

B) $x^2+y^2+6x-2y+9=0$

C) $x^2+y^2-6x+2y+1=0$

D) $x^2+y^2+6x-2y+1=0$

E) $x^2+y^2-6x-2y+1=0$

5) If the line $ax + by + 12 = 0$ with the x–intercept -6 is **parallel** to the line $2x + y = 1$, then $a + b =$

A) 3

B) 2

C) 1

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

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

6) In the adjacent figure, if line $\mathbf{L_1}$ is **perpendicular** to line $\mathbf{L_2}$, then the y–intercept of $\mathbf{L_2}$, is equal to

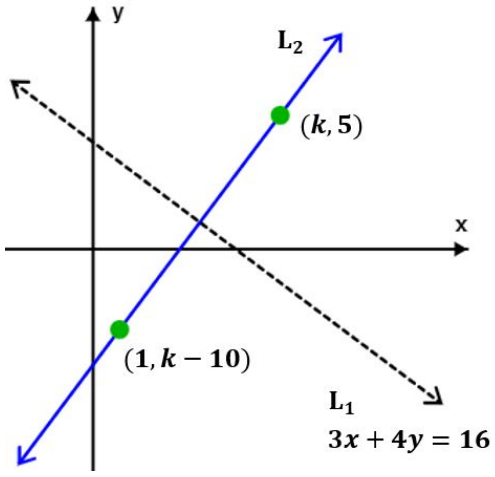
A) $-\frac{13}{3}$

B) $-\frac{16}{3}$

C) $-\frac{9}{2}$

D) -4

E) -3



7) If $\frac{1}{2} + \sqrt{2}$ and $\frac{1}{2} - \sqrt{2}$ are the **solutions** of the quadratic equation $4x^2 + bx + c = 0$, then $b + c =$

A) -11

B) $-\frac{7}{4}$

C) 3

D) $1 + 2\sqrt{2}$

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

8) The solution set of the equation $2x^2 + 3\sqrt{2}\,x - 4 = 0$, contains

A) one positive and one negative irrational numbers.

B) one positive and one negative rational numbers.

C) only one negative irrational number.

D) only one positive irrational number.

E) only one positive rational number.

9) If the complex number $z + \frac{1}{z} = 3 - 4i$ with $z \neq 0$, then the imaginary part of $z^2 + \frac{1}{z^2}$, is

A) -24

B) 14

C) -9

D) 9

E) -4

10) The complex number $\frac{26 i^{18}}{2 + 3i} + \sqrt[3]{-8} - \sqrt{-9}$, in standard form, is

A) $-6 + 3i$

B) $-2 + 3i$

C) $2 - 9i$

D) $-2 - 9i$

E) $-5 - 7i$

11) The **product** of all the solution(s) of $\left(\frac{x+2}{x}\right)^2 + 8\left(\frac{x+2}{x}\right) + 7 = 0$, is

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

B) $-\frac{5}{4}$

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

D) -4

E) -1

12) The equation $5(2x-1)^{-1/3} - (2x-1)^{2/3} = 0$ has

A) one positive real number only

B) one negative real number only

C) no solution

D) two positive real numbers

E) one positive and one negative real numbers

13) The **solution set** , in interval notation , of the inequality $\frac{3}{x} \leq \frac{x}{3}$, is

A) $[-3, 0) \cup [3, \infty)$

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

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

D) $(-\infty, -3] \cup (0, 3]$

E) $[-3, 0) \cup (0, 3]$

14) The **domain** of the function $f(x) = \sqrt{\frac{1-x}{|x|}}$, is

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

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

C) $[-1, 0) \cup [1, \infty)$

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

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

15) The **sum** of all the solution(s) of the equation $2\left|2x-5\right| = 1$, is

A) 5

B) 10

C) $\frac{11}{4}$

D) $\frac{9}{4}$

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

16) If $(-\infty, m)\cup(n, \infty)$ is the **solution set** of the inequality $\left|5-3x\right|+1 > 3$, then $n =$

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

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

C) 1

D) -1

E) -3

17) Which one of the following defines y as a function of x ?

A) $\sqrt{x} - \sqrt{y} = 7$

B) $\{(0, 6), (2, 5), (0, 8)\}$

C) $|5y - 1| = 3x$

D) $x - 5 = 0$

E) $x + 2 = y^4$

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

A) -2

B) $-\frac{7}{2}$

C) -1

D) $-\frac{5}{2}$

E) 0

19) The graph of the function $f(x) = \begin{cases} x^2 + 1, & \text{if } x \leq 1 \\ -x + 1, & \text{if } x > 1 \end{cases}$

A) has range $(-\infty, 0) \cup [1, \infty)$

B) lies below the x–axis over $(0, \infty)$

C) has one x–intercept and one y–intercept

D) is decreasing over $(0, 1)$

E) is increasing over $(-\infty, 0)$

20) If $f(x)$ is a **linear function** such that $f(2) = 1$ and $f(-1) = 2$, then the x–intercept of the graph of $f(x)$ is

A) 5

B) -5

C) $\frac{5}{3}$

D) -3

E) $\frac{5}{9}$

Answer Key
Testname: MATH001_E2_251

1) A
2) A
3) A
4) A
5) A
6) A
7) A
8) A
9) A
10) A
11) A
12) A
13) A
14) A
15) A
16) A
17) A
18) A
19) A
20) A