1) The sum of all the solution(s) of the equation $\frac{x^2 + 2x}{x^2 - 36} + \frac{2}{x + 6} = \frac{1}{x - 6}$ is

A) 3

B) - 3

C) 9

D) - 9

E) - 1

2) If the quadratic function $f(x) = ax^2 + bx + c$ has only one x-intercept $(2, 0)$ and y-intercept $(0 , - 8)$, then $a + b + c =$

A) - 2

B) - 4

C) 4

D) 2

E) 3

3) If the quadratic equation $x^2 + 2kx + 2k = -3$ has two non real complex solutions, then the set of all values of k *is*

A) $(-\infty, 0) \cup (2, \infty)$

B) $(-1, 3)$

C) $(-\infty, -1) \cup (3, \infty)$

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

E) $(-\infty, -3) \cup (4, \infty)$

4) If $f(x) = -x^2 + 3x + 1$ and $g(x) = [\![x - 3]\!]$, then $(f \circ g)(2\pi) =$

A) 17

B) -17

C) 13

D) 1

E) 19

5) The sum of all the solutions of the equation $9(2x+1)^{-\frac{1}{3}} - (2x+1)^{\frac{2}{3}} = 0$ is

A) -5

B) 5

C) $\frac{7}{2}$

D) -4

E) 4

6) If $f(x) = x^2 - 2x + 3$ and $h \neq 0$, then $\frac{f(x+h) - f(x)}{h} =$

A) $2x - h + 2$

B) $2x + h + 2$

C) $x + h - 2$

D) $2x - h - 2$

E) $2x + h - 2$

7) If $(1, k)$ is the vertex of the quadratic function $f(x) = -2x^2 + mx + m + 1$, then the range of f is

A) $(-\infty, 4]$

B) $(-\infty, 1]$

C) $[4, \infty)$

D) $[7, \infty)$

E) $(-\infty, 7]$

8) If $f(x) = \frac{x}{x+1}$ and $g(x) = \frac{x-2}{2x+4}$, then the domain of the function $\frac{f}{g}$ is

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

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

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

D) $(-\infty, -2) \cup (-2, -1) \cup (-1, 2) \cup (2, \infty)$

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

9) The solution set of the inequality $-\frac{3}{2} \leq \frac{2-x}{6} \leq \frac{5}{3}$ is

A) $[11, \infty)$

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

C) $\left[-8, 11\right]$

D) $(-\infty, 8]$

E) $(-\infty, -8] \cup [4, \infty)$

10) Which ONE of the following does NOT represent y as a function of x ?

A) $y = 1$

B) $x^2 + (y-1)^3 = 4$

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

D) $x^2 - \sqrt[3]{y} = 0$

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

11) The solution set of the inequality $\frac{2x-3}{x+1} \geq 1$ is

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

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

C) $(-1, 4]$

D) $[4, \infty)$

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

12) Let f be a linear function such that $f(t) = -\frac{1}{2}$ and $f(t+2) = \frac{7}{2}$, then $f(t - \frac{3}{4}) =$

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

B) -2

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

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

E) 2

13) The graph of the equation $xy = |x^3 - y|$ is

A) symmetric with respect to the x-axis only.

B) symmetric with respect to the x-axis and y-axis.

C) symmetric with respect to the origin only.

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

E) symmetric with respect to the y-axis only.

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

A) 3

B) - 1

C) 2

D) 0

E) 1

15) If $f(x) = \begin{cases} [\![2x + 6]\!] , & \text{if } x \le -1 \\ |3x - 4| , & \text{if } -1 \le x \le 2 \\ 3 , & \text{if } x > 2 \end{cases}$, then $f(-\pi) + f(1) + f(4) =$

A) -3

B) $-2\pi + 9$

C) $-2\pi + 10$

D) 3

E) 4

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

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

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

C) $(-\infty, -3) \cup (-3, 1) \cup (1, 3) \cup (3, \infty)$

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

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

17) If $\dfrac{10}{2+i} + \dfrac{6\sqrt[3]{-8}}{\sqrt{-9}\,\sqrt{-4}} = a + bi$, where $i = \sqrt{-1}$, then $a + b =$

A) -2

B) 6

C) 2

D) 4

E) -1

18) Let $f(x) = \begin{cases} -x+1, & \text{if } x \le 0 \\ |x-1|, & \text{if } 0 < x \le 2 \\ 1, & \text{if } x > 2 \end{cases}$. Then the graph of f is increasing on the interval

A) $(2, \infty)$

B) $(1, 2)$

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

D) $(0, 1)$

E) $(-\infty, 1)$

19) Let f be a function such that $(1, -2)$ is a point on the graph of f. If (a, b) is the corresponding point that lies on the graph of $g(x) = -f(x - 3) + 2$, then $a + b =$

A) 4

B) 6

C) 8

D) 2

E) 7

20) The solution set of the inequality $\left|\frac{3}{x - 6}\right| > 1$ is

A) $(-\infty, 3) \cup (9, \infty)$

B) $(3, 6) \cup (6, 9)$

C) $(-\infty, 3)$

D) $(-\infty, 6) \cup (6, \infty)$

E) $(3, 9)$

Answer Key
Testname: MATH 001 MAJOR 2 - CODE 001

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