1) Which one of the following statements is TRUE?

A) $(6.25)^2 - (0.25)^2 = 39$

B) $9.07 - 11.7 = 2.63$

C) $9.30 \div 0.93 = 1$

D) $9.7 + 0.175 = 10.175$

E) $2^{-1} + \sqrt{\frac{1}{4}} + \sqrt{-\frac{1}{8}} = \frac{3}{2}$

2) The set $\left\{ \frac{1}{2}, 0, 4, 0.\overline{25}, -3, 0.131131113\cdots, -\pi, \sqrt{25} \right\}$ has

A) three whole numbers.

B) five rational numbers.

C) five integers.

D) three irrational numbers.

E) three natural numbers.

3) If $x < -2$, then $|-x| + |x| - |x+2| =$

A) $-x+2$

B) $x+2$

C) $x-2$

D) $-3x-2$

E) $-x-2$

4) The expression $[2x-(3+y)][2x+(3+y)]$ is equal to

A) $4x^2 - 9 - 6y - y^2$

B) $4x^2 + 9 + 6y + y^2$

C) $4x^2 - 9 + 6xy + y^2$

D) $4x^2 - 9 + 6y - y^2$

E) $4x^2 + 9 - 6y + y^2$

5) When dividing $-15x^3 + x^2 + x + 9$ by $5x + 3$, the remainder is

A) 12

B) 4

C) 6

D) -12

E) -6

6) If the coefficient of x^3 in the product $3x^2\left(kx - \frac{1}{k}\right)\left(4x + \frac{2}{k}\right)$ is 4 then $k =$

A) 6

B) -2

C) 8

D) 10

E) -8

7) One factor of $3x^2 + 4y - 12 - x^2y$ is :

A) $x - 2$

B) $y + 3$

C) $y - 4$

D) $y + 4$

E) $x^2 + 4$

8) One factor of the polynomial $2p^6 - p^3 - 3$ is :

A) $p^2 - p + 1$

B) $p^2 + p - 1$

C) $2p^3 + 3$

D) $p - 1$

E) $3p^3 - 2$

9) One factor of $x^4 + 3x^2 + 4$ is

A) $x^2 - x + 2$

B) $x^2 - x - 1$

C) $x^2 + 4$

D) $x^2 + x - 1$

E) $x^2 + 1$

10)

The expression $\dfrac{\dfrac{2}{y} - \dfrac{3y - 2}{y - 1}}{\dfrac{y}{y - 1}}$ simplifies to :

A) $\dfrac{-3y^2 + 4y - 2}{y^2}$

B) $\dfrac{3y^2 + 4y + 2}{y^2}$

C) $\dfrac{y^2 + 4y + 2}{y^2}$

D) $\dfrac{2y^2 + 5}{y - 1}$

E) $\dfrac{2y^2 + 3}{y - 1}$

11) The expression :

$$\frac{1}{4-x} + \frac{1}{x^2+4x+16} \div \frac{x^2-8x+16}{x^3-64}$$ is equal to :

A) 0

B) $\frac{2}{x-4}$

C) $\frac{2}{4-x}$

D) 1

E) $\frac{1}{x^2-16}$

12) $\frac{x^9 \left(2x^2\right)^{-1}(2x^5)^{-2}}{(2^{-1}x^{-2})^2}$ is equal to

A) $\frac{x}{2}$

B) $2x$

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

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

E) $\frac{1}{32x^7}$

13) $\dfrac{7(3y+1)^{\frac{1}{4}} - (y-1)(3y+1)^{-\frac{3}{4}}}{(3y+1)^{-\frac{3}{4}}}$ simplifies to

A) $20y + 8$

B) $21y + 6$

C) $\dfrac{20y+7}{3y+1}$

D) $20y$

E) $(20y+8)(3y+1)^{\frac{3}{2}}$

14) The expression $\dfrac{x^2y}{\sqrt[3]{x^4y^2}}$ simplifies to

A) $\sqrt[3]{x^2y}$

B) $\sqrt[3]{xy^2}$

C) $\sqrt[3]{x^2y^2}$

D) $\dfrac{\sqrt[3]{x^2y}}{xy}$

E) $\dfrac{\sqrt[3]{xy^2}}{xy}$

15) If $x > 0$ and $y > 0$, then the expression $xy\sqrt[4]{81\,x^6\,y^3} + \sqrt[4]{16\,x^{10}\,y^7}$ simplifies to

A) $5x^2y\sqrt[4]{x^2\,y^3}$

B) $5x^2\,y\sqrt[4]{x^2y}$

C) $5x^3\,y\sqrt[4]{x^3\,y^2}$

D) $13x\,y^2\sqrt[4]{2x^2\,y}$

E) $13x^2y\sqrt[4]{x^2\,y^3}$

16) The real part of the complex number $\left(\sqrt{-9} - \sqrt[3]{-8}\right)^2 + i^{-99}$, ($i = \sqrt{-1}$) , is equal to:

A) -5

B) -13

C) 8

D) 5

E) 13

17) If $\frac{i-1}{i+1} - \sqrt{-8}\,\sqrt{-2} = x + iy$, where $i = \sqrt{-1}$ then $x + y$ equals to :

A) 5

B) -3

C) -5

D) 3

E) -2

18) The expression $\left(\frac{2^3}{5} + \frac{5}{4}\right)^{-1} - \frac{1}{3}$ simplifies to :

A) $\frac{1}{57}$

B) $\frac{131}{60}$

C) $\frac{39}{57}$

D) $\frac{151}{60}$

E) $-\frac{39}{57}$

19) Which one of the following statements is FALSE?

A) every rational number is either even or odd.

B) every real number is either rational or irrational.

C) all repeating decimals are rational numbers.

D) $8\,(xy + 5) = 8\,(yx + 5)$ represents the commutative property of multiplication.

E) the multiplicative inverse of $5\frac{1}{4}$ is $\frac{4}{21}$.

20) Let $U=\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$ be the universal set . If $N=\{0, 1, 7\}$, $L=\{0, 1, 2, 4, 5, 6, 7\}$ and $M=\{4, 6, 7, 8, 9\}$, then $(N' \cup L) \cap M =$

A) M

B) N'

C) φ

D) $M \cup N'$

E) N