**King Fahd University of Petroleum and Minerals**
**Prep-Year Math Program**
**Math (001)-Term (131)**
**Recitation (R1 and R2)**
**Answered by Sayed Omar**

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**Question 1:** Given the following numbers:

$-1,\ 0,\ 1,\ 2,\ -91,\ 2.12122123...,\ \frac{22}{7},\ -41,\ 2.2\overline{3},\ \pi,\ \frac{\sqrt{2}}{3},\ \frac{\sqrt{81}}{3},\ 3.14,\ \frac{12.1}{1.1}$

Complete the following:

Integers: _____

Rational Numbers: _____

Non-Integer Rational Numbers: _____

Non-Negative Integer Numbers: _____

Irrational Numbers: _____

## Answer:

Integers: $-1,\ 0,\ 1,\ 2,\ -91,\ -41,\ \frac{\sqrt{81}}{3},\ \frac{12.1}{1.1}$

Rational Numbers: $-1,\ 0,\ 1,\ 2,\ -91,\ \frac{22}{7},\ -41,\ 2.2\overline{3},\ \frac{\sqrt{81}}{3},\ 3.14,\ \frac{12.1}{1.1}$

Non-Integer Rational Numbers: $\frac{22}{7},\ \ 2.2\overline{3},\ 3.14$

Non-Negative Integer Numbers: $0,\ 1,\ 2,\ \frac{\sqrt{81}}{3}=3,\ \frac{12.1}{1.1}=11$

Irrational Numbers: $2.12122123...,\ \pi,\ \frac{\sqrt{2}}{3}$

## Question 2:

Let $U$ be the universal set, where: $U=\{x \mid x \text{ is a whole number less than } 11\}$ and

$A=\{x \mid x \text{ is an even natural number } \le 8\}$

$B=\{2,4,5,8,10\}$

$C=\{1,2,4,5,7,8\}$

**i.** Find: $(A\cap B)'=$ $B'\cup C'=$

**ii.** Answer the following as TRUE or FALSE?

## Answer:

**(i):** $(A\cap B)'=\{0,1,3,5,6,7,9,10\}$ $B'\cup C'=\{0,1,3,6,7,9,10\}$

## Answer: (ii):

a) $A' = \{0,1,3,5,7,9,10\}$ TRUE

b) $\varnothing \in U$ FALSE

c) $\{0\} \subseteq A$ FALSE

d) $\varnothing \subseteq U$ TRUE

e) $A \cup B' = \{0,1,2,5,6\}$ FALSE

f) $(A \cap B)' = B' \cup C'$ FALSE

## Question 3:

If $x = 3 \cdot 4^2 + |-7| - 3^4 \div 9$, $y = 35 - 20 \div 5 \times 2 - 6 \times 3$ and $z = 6 - 4 \div 2 + 45$,

then find the value of the expression: $x - 2[y \div (z - x)]$

**Answer:** $x - 2[y \div (z - x)] = 40$

## Question 4: TRUE or FALSE

1) The operation of division of real numbers is associative. **FALSE**

2) $\dfrac{2x + w}{x + 3y} = \dfrac{2 + w}{1 + 3y}$ **FALSE**

3) If $x$ is any real number, then $|-x - 1| = x + 1$. **FALSE**

4) If $x$ is any real number, then $|-x - y| = |x + y|$. **TRUE**

5) $2(x + 2)\left(x - \dfrac{1}{2}\right) = (x + 2)(2x - 1)$ **TRUE**

6) Any integer number is either positive or negative. **FALSE**

## Question 5:

*a)* If $x < 0$ , then $|x| + |-x| + x =$

A) $3x$ B) $-2x$ C) $x$

D) $-x$ E) $-3x$

*b)* If $-3 < x < -2$, then $|-3x| + \sqrt{(x-3)^2} + 2|x+1| =$

A) $1-6x$ B) $4x+1$

D) $5-2x$ E) $1$

**Question 6:** Let $A = \{y \mid y = x - |x|$, where $x$ is an integer $-4 < x \le 0\}$ and $B = \{-6, -4, -2, -1, 0\}$, then $A \cap B =$

A) $\{-4, -2\}$ B) $A$ C) $\phi$ (the empty set)

D) $A \cup B$ E) $B$