King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math (001)-Term (181)
Recitation (P.2)

Question 1: If $A = \{x \mid x \leq -3\} \cup \{x \mid x > 1\}$, $B = \{x \mid -6 \leq x < 8\}$ and $C = \{x \mid 1 \geq x > -1\}$ then find $(A \cap B) \cup C$.

Answer: $[-6, -3] \cup (-1, 8)$

Question 2:
Let a, b and c be real numbers such that $a > 0$, $b < 0$ and $c < 0$. Find the sign of each expression

(a) $-b$ **(b)** $a - c$ **(c)** $ab + ac$ **(d)** ab^2

Solution:
(a): $b < 0 \implies -b > 0$
(b): $a > 0$ and $c < 0 \implies a - c = a + (-c) > 0$
(c): $a > 0$, $b < 0$, $c < 0 \implies ab < 0$ and $ac < 0 \implies ab + ac < 0$
(d): $a > 0$ and $b^2 > 0 \implies ab^2 > 0$

Question 3: Given the sets $A = \{-4, -2, 0, 2, 4, 6, 8, 9\}$
$B = \{y \mid y$ is an even prime number$\}$
$C = \{y \mid y$ is a composite number $< 9\}$
Then $A \cup (B \cap C) =$

(a) $A \cup B$ (b) $B \cup C$ (c) C (d) A (e) $\varnothing$
Answer: (d) A

Question 4: Which one of the following statements is TRUE?
(a): Every rational number has a multiplicative inverse.
(b): Every irrational numbers is not real number.
(c): Every even integer has and additive inverse.
(d): $\pi = \dfrac{22}{7}$
(e): The sum of two rational numbers is always rational.

Answer:
(a): False. Because 0 is a rational number but 0 does not have a multiplicative inverse.
(b): False. Every irrational number is real number.
(c): True. Every even integer has an additive inverse.
(d): False. $\pi \approx \dfrac{22}{7}$
(e): True. If a and b are rational numbers then $a + b$ is also a rational number.

Question 5: Which one of the following statements is TRUE?

(a): The sum of two irrational numbers is always irrational.

(b): The distance between a and b is the same as the distance between b and a.

(c): If x is any integer and y is any irrational number, then x/y is irrational.

(d): The distributive law states that $a \div (b + c) = (a \div b) + (a \div c)$

(e): Any irrational number has a terminating or repeating decimal expansion.

Answer: (b)

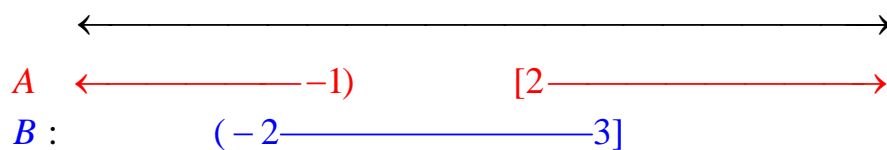**Question 6:** Given $\dfrac{1}{3} \le x < \dfrac{2}{3}$, the expression $\left| x - \dfrac{2}{3} \right| - \left| \dfrac{1}{4} - x \right|$ can be written without the absolute value symbols as:

(a) $-\dfrac{11}{12}$ 　　　(b) $2x - \dfrac{11}{12}$ 　　(c) $\dfrac{11}{12} - 2x$ 　　(d) $-\dfrac{5}{12}$ 　　(e) $\dfrac{5}{12}$

Answer: (c)

Question 7: If $A = (-\infty, -1) \cup [2, \infty)$ and $B = (-2, 3]$, then find $A \cap B$.

Solution:

A 　←────────────$-1)$　　　　$[2$────────────→

B :　　　　$(-2$────────────$3]$

Answer: $A \cap B = (-2, -1) \cup [2, 3]$

Question 8: The expression $\left[-2 + \dfrac{11}{5} + \left(-\dfrac{11}{5} \right) \right] \div \left(\dfrac{1}{3} - \dfrac{1}{4} \right) - \left(\dfrac{-3^2}{4} \right) + 2$ simplifies to:

(a) $-\dfrac{79}{4}$

(b) $\dfrac{7}{3}$

(c) $-\dfrac{97}{4}$

(d) $\dfrac{49}{12}$

(e) $-\dfrac{5}{12}$

Answer: (a) $-\dfrac{79}{4}$