

WORKSHEET

CHAPTER 1.1 A: OPERATIONS WITH REAL NUMBERS

Operations with real numbers

The sets of numbers are:

- **Natural numbers** (0, 1, 2, 3, ...)
- **Integers** (... , -3, -2, -1, 0, 1, 2, 3, ...)
- **Rational numbers**, which are all numbers that can be written as a fraction

$\frac{\mu}{\nu}$, where μ and ν are integers and $\nu \neq 0$

- **Irrational numbers**, which are numbers that are not rational.
- **Real numbers** consist of all and numbers.

The **absolute value** of a number a is defined as the of the point representing the number a from the origin of the axis, and it is denoted by

TOPIC A: Theory & Sets of Numbers

1. Classify the following statements as True (T) or False (F):

- Every rational number is also a real number. []
- The reciprocal of the number $-\frac{3}{5}$ is $\frac{3}{5}$. []
- If $a \cdot \beta = 0$, then necessarily $a = 0$ and $\beta = 0$. []
- The distributive property is expressed by the relation $a \cdot (\beta + \gamma) = a \cdot \beta + a \cdot \gamma$ []
- The opposite of the number $-(-4)$ is 4. []

2. Classification of Numbers:

The following numbers are given: $+3, -2, \frac{5}{3}, \sqrt{2}, -\frac{2}{3}, \pi, \sqrt{3}, \sqrt{9}, 0, -0,3$

Complete the table below by marking (✓) in the correct column:

Αριθμός	Ακέραιος ($\mathbb{Z}$)	Ρητός ($\mathbb{Q}$)	Άρρητος
+3			
-2			
$\frac{5}{3}$			
$\sqrt{2}$			
$-\frac{2}{3}$			
π			
$\sqrt{3}$			
$\sqrt{9}$			
0			
-0.3			

TOPIC B: Numerical Expressions & Order of Operations

1. Calculate the value of the following numerical expressions:

$$A = 3 + 4 \cdot 6 - 36 : (-4) + 2$$

$$B = -10 : (-4 - 6) - [-(4 - 2) + (1 - 3)]$$

$$\Gamma = (-14) \cdot (-4) \cdot (3 - 3) \cdot (1935 - 678)$$

$$\Delta = 25 : |2 - 7| + [2 - 4 \cdot (2 : 4) - 3]$$

TOPIC C: Algebraic Expressions & Removing Parentheses

1. Simplify the expressions by removing parentheses and combining like terms:

$$A = (-4) - (-5x) + (7x - 4) - (5x - 10) - (-4x) \cdot (-5)$$

$$B = -(3x + 1) - [-(3 + 10x) + (-10x - 7)]$$

2. Given the expressions: $x = a - 2(\beta + 4) + 2\gamma$ and $y = 4(a + 1) + 7\beta + 2\gamma$.

a) Simplify the expressions x and y .

β) Calculate the value of the expression $x + y$.

TOPIC D: Complex Exercises & Expression Calculation

1. Given the numbers a and β such that $a + \beta = 4$ and $a \cdot \beta = -12$. Calculate the values of the expressions:

i) $A = 3a + 3\beta$

ii) $B = a^2\beta + a\beta^2$

iii) $\Gamma = (a - 2)(\beta - 2) - 2$

2. If $a \cdot \beta = 1$ and $a + \beta = -5$, prove that: $(a + 5) \cdot \beta + (a + 5) = 0$.