

Alg: 2

1.2. OPERATIONS ON RATIONAL NUMBERS:-

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OBJECTIVE: 1 OPERATIONS ON INTEGERS:-

NUMBERS THAT HAVE THE SAME SIGN:- To add numbers with the same sign, add the absolute value of each number. THEN attach the sign of the addends. $20 + 40 = 60$; $-20 - 40 = -60$

NUMBERS THAT HAVE DIFFERENT SIGNS:- Find the absolute value of each number. Subtract the smaller of these absolute values from the larger. Then attach the sign of the number with the larger absolute value:
1) $-20 + 40$ $| -20 | = 20$, $| 40 | = 40$. So $40 - 20 = 20$
2) $20 - 40$ $| 20 | = 20$, $| -40 | = 40$ 'So', $20 - 40 = -20$

SUBTRACTION OF Real Numbers:- If a and b are real numbers, then $a - b = a + (-b)$. EX:- $-30 - 20 = (-30) + (-20) = -50$

SIGN RULE FOR MULTIPLICATION:- THE product of two numbers with the same sign is positive: $(-4)(-9) = 36$, $(4)(9) = 36$.
Numbers that have different signs:- THE product of two numbers with different signs is negative. $(4)(-9) = -36$.

MULTIPLICATIVE INVERSE:- MULTIPLICATIVE INVERSE OF A NON-ZERO number a is $\frac{1}{a}$. EX:- MULTIPLICATIVE INVERSE OF 2 IS $\frac{1}{2}$.

DIVISION OF Real Numbers:- $a \div b = a \cdot \frac{1}{b}$
 $\frac{-a}{b} = \frac{a}{-b} = -\frac{a}{b}$

PROPERTY OF ZERO and ONE IN DIVISION:- $\frac{a}{1} = a$
 $\frac{0}{a} = 0$, ($a \neq 0$)

Objective: 2: ① Addition of Fractions: - $\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$

Lowest common denominator is the least common multiple (Lcm)

Ex: $\frac{5}{6} + \left(\frac{-7}{8}\right)$

$$\frac{5}{6} \cdot \frac{4}{4} + \left(\frac{-7}{8}\right) \cdot \frac{3}{3} = \frac{20}{24} + \left(\frac{-21}{24}\right) = \frac{20+(-21)}{24} = \boxed{\frac{-1}{24}}$$

② Multiplication of Fractions: - $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$

Ex: - $-\frac{5}{12} \cdot \frac{4}{10} = -\frac{20}{120} = -\frac{10}{60} = \boxed{\frac{-1}{6}}$ Simplest Form: -

③ Division of Fractions: - $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$

Ex: - $\frac{3}{8} \div \frac{9}{16} = \frac{3}{8} \cdot \frac{16}{9} = \boxed{\frac{2}{3}}$

Objective: 3: - Exponential Expressions: -

Nth power of a: - $a^N = a \cdot a \cdot a \cdots a$

Ex: $a^5 = a \cdot a \cdot a \cdot a \cdot a$

Objective 4: THE ORDER OF OPERATIONS: - PEMDAS

P = PARENTHESIS, brackets [], the absolute value symbols | |, and the fraction bar.

E = Exponents,

M = Multiplication

D = Division

A = Addition

S = Subtraction

from left to right

from left to right