

J.K.G.INTERNATIONAL SCHOOL
CHAPTER AT A GLANCE
RATIONAL NUMBERS – 1 Class VIII

Pre –requisite Knowledge

Natural Numbers;- Counting Numbers like – 1,2,3,4,5.....

Whole numbers ;- Natural Numbers including 0 like- 0,1,2,3,4,5.....

Integers :- Whole numbers including negative of natural numbers

Like --5,-4,-3,-2,-1,0,1,2,3,4,5.....

Fraction- A part of a whole or a quantity which can be written in the form of N/D where N and D are whole numbers and $D \neq 0$

Rational Numbers

The numbers of the form N/D, where 'N' and 'D' are integers and $D \neq 0$, are called rational numbers. **OR** Collection of integers, Fractions and negative of fractions are called rational numbers.

Positive Rational no. - $3/4, 7/6, 5/9$ etc.

Negative Rational no. - $3/4, -7/6, -5/9$ etc.

Properties of rational numbers (Under addition and multiplication)

1. **Closure property**- If A and B are two rational nos. then-

$$A + b = C \quad \text{Or} \quad A \times B = C \quad \text{Where C is also a rational no.}$$

Eg. $-4/5 + 1/5 = -3/5$ **Or** $-4/5 \times 1/5 = -4/25$ ($-3/5$ & $-4/25$ are rational no.)

2. **Commutative property**- If A and B are two rational nos. then-

$$A+B = B+A \quad \text{Or} \quad A \times B = B \times A$$

Eg. $1/2 + (-3/4) = -3/4 + 1/2$ **Or** $1/2 \times -3/4 = -3/4 \times 1/2$
 $-1/4 = -1/4$ **Or** $-3/8 = -3/8$

(this property does not hold for subtraction and division)

3. **Associative property**- If A, B and C are rational no. then-

$$(A+B)+C=A+(B+C) \quad \text{Or} \quad A \times (B \times C) = (A \times B) \times C$$

Eg. $(-1/6 + 2/6) + (-5/6) = (-1/6) + (2/6 + -5/6) = -4/6$

Or $(-1/6 \times 2/6) \times (-5/6) = (-1/6) \times (2/6 \times -5/6) = 10/216$

(this property does not hold for subtraction and division)

4. **Additive Identity** -If A is any rational no. then- $A + 0 = A = 0 + A$

Eg. $-6/5 + 0 = -6/5 = 0 + -6/5$

(**0 is called Additive identity** because When we add 0 to any no. the identity of no. does not change.)

5. **Multiplicative Identity** -If A is any rational no. then- $A \times 1 = A = 1 \times A$

Eg. $-6/5 \times 1 = -6/5 = 1 \times -6/5$

(**1 is called multiplicative identity** because When we multiply 1 to any no. the identity of no. does not change.)

6. **Additive inverse** If A is any rational no. and $A + (-A) = 0$

Then we can say that (-A) is additive inverse of A or A is additive inv. of (-A)

Eg. $(-5/6)$ is additive inverse of $(5/7)$ & $(5/6)$ is additive inverse of $(-5/7)$

If $-5/6 + 5/6 = 0$

7. **Multiplicative inverse**-If p is a rational no. where $p \neq 0$ and $P \times 1/P = 1$

Then we can say that multiplicative inverse of P is $1/P$ and of $1/P$ is P

Eg. multiplicative inverse of -6 is $-1/6$ (also called reciprocal)

8. **Distributive property of multiplication**

over addition-

$$A \times (B+C) = (A \times B) + (A \times C)$$

Over subtraction-

$$A \times (B-C) = (A \times B) - (A \times C)$$

Eg. $-3/4 \times (5/6 + 7/8) = (-3/4 \times 5/6) + (-3/4 \times 7/8)$

Eg. $-3/4 \times (5/6 - 7/8) = (-3/4 \times 5/6) - (-3/4 \times 7/8)$

Mind it

*Every integer & every fraction is a rational number.

*Every terminating decimal no. & non terminating repeating no. is a rational number.

* 0 has no reciprocal (multiplicative inverse)

*Reciprocal of 1 is 1 and -1 is -1

Assignment

Q1: Choose the correct answer

- (a) The additive inverse of $\frac{-7}{3}$ is
(i) $\frac{-3}{7}$ (ii) $\frac{7}{-3}$ (iii) $\frac{7}{3}$ (iv) $\frac{3}{7}$
- (b) The multiplicative inverse of $\frac{-9}{5}$ is
(i) $\frac{-5}{9}$ (ii) $\frac{-9}{5}$ (iii) $\frac{9}{5}$ (iv) $\frac{-9}{-5}$
- (c) Rational numbers are commutative under:-
(i) Addition and subtraction only
(ii) Subtraction and multiplication only
(iii) Addition and multiplications
(iv) Subtraction and division only
- (d) The product of $\frac{-7}{2}$ and its reciprocal is
(i) -1 (ii) 1 (iii) $\frac{-49}{4}$ (iv) $\frac{49}{4}$
- (e) Every integer is a -
(i) Whole number (ii) Rational Number
(iii) National number (iv) fractions

Q2: Name the property for the following (a, b, c are rational numbers)

- (i) $a + o = o + a = a$ (ii) $a \times (b + c) = a \times b + a \times c$
(iii) $a + (b + c) = (a + b) + c$ (iv) $a \div (b \div c) \neq (a \div b) \div c$
(v) $a + (-a) = 0$ (vi) $\frac{1}{a} \times 1 = 1 \times \frac{1}{a} = \frac{1}{a}$
(vii) $b \times c = c \times b$

Q3: Find 5 rational numbers between

- (a) $\frac{2}{3}$ and $\frac{2}{5}$ (b) -2 and -3 (c) -3 and $\frac{-1}{3}$ (d) 2.1 and 2.2

- Q4: Simplify (a) $\frac{-4}{5} + \frac{5}{7} \times \frac{8}{9} + \frac{8}{9} \times \frac{4}{7}$ (b) $\frac{-7}{9} - \left(\frac{-5}{12}\right) + \frac{1}{3}$
(c) $\left(-21 \times \frac{5}{3}\right) - \left(\frac{16}{9} \times \frac{21}{30}\right)$ (d) $2\frac{1}{3} + 3\frac{1}{2} - 5\frac{6}{7} - 2\frac{7}{15}$

Q5: Divide the sum of $\frac{11}{7}$ and $\frac{-7}{5}$ by their product.

Q6: Divide the sum of $\left(\frac{1}{3} + \frac{-2}{5} - \frac{4}{15}\right)$ by the difference of $\frac{6}{7}$ and $\frac{3}{5}$

Q7: Arrange in ascending order

$$\frac{-1}{2}, \frac{5}{3}, \frac{3}{-4}, \frac{7}{2}, \frac{-6}{-5}$$

Q8: Find the value of x

(a) $\frac{-19}{x} = \frac{-57}{105}$ (b) $\frac{6}{7} = \frac{30}{x}$

Q9: The length of rectangle of perimeter 64 cm. is $\frac{5}{3}$ rd of its breadth find the area of rectangle

Q10: A florist had 400 flowers in his shop He sold $\frac{1}{10}$ th of them in the morning. Out of the remaining flowers $\frac{1}{3}$ rd were sold in the evening. $\frac{1}{6}$ th of the remaining flowers were withered and could not be sold. Find the total flowers sold and flowers left.

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ASSIGNMENT (INTEGERS)

1. Fill in the blanks:
 - a. The greatest negative integer is _____
 - b. The successor of -91 is _____.
 - c. The predecessor of -380 is _____
 - d. The product of _____ and (-1) is -35.
 - e. $(-63) + \underline{\hspace{1cm}} = (-63)$
 - f. $14 + \underline{\hspace{1cm}} = 0$
 - g. $\underline{\hspace{1cm}} \div (-75) = 0$
 - h. $\underline{\hspace{1cm}} \times 1 = 729$
2. Arrange the following in:
 - (i) Ascending order: -8,-4, 0,-11, 9, 4, 6, 13,-27, 19
 - (ii) Descending order: -6, -4, 0, -11, 9, 4, 6, 13,-27, 19
3. Find the value of:
 - (i) $-37 - (-15) - 2$ (ii) $16 - [14 - (-2) - (-6)]$
 - (iii) $-4 \times -2 \times 1$ (iv) $-17 \times -15 \times -12$
4. Name the additive inverse of:
(a) 15 (b) -23 (c) 0
5. Compute using suitable groupings:
(i) $42 + 11 + 58 + 19$ (ii) $(-15) + 24 + 5 + (-4)$ (iii) $(-8) \times 125 \times 3 \times 4$
6. Find the product using suitable identities:
(i) $(-48) \times 105$ (ii) 62×199 (iii) $115 \times (-98)$ (iv) $325 \times (-204)$
8. The product of three integers is -600. If two of them are -15 and 10, then find the third integer.
9. Arnav had Rs20 with him. He spent Rs 8 on Monday , got Rs 5 as pocket money on Tuesday, gave Rs 7 loan to a friend on Wednesday, ate an ice-cream worth Rs 10 on Thursday, received a reward of Rs 5 from his grandfather on Friday. How much does he have on Sunday, if his friend repays the loan on Saturday?
10. A tanker contains 500 liters of milk. Due to small hole in the tanker, the quantity of milk is decreasing at rate of 9 liters every hour. What will be the quantity of the milk after 10 hours?
11. Aastha multiplied two numbers and got -4 as the product. She then subtracted the second number from the first and got the answer as 5. Find the two numbers.

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