



ST. LAWRENCE HIGH SCHOOL



A JESUIT CHRISTIAN MINORITY INSTITUTION

SUBJECT :Arithmetic

CLASS 8 STUDY MATERIAL 3 Rational Numbers

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RATIONAL NUMBERS

Synopsis

◆ Natural numbers (N)

1, 2, 3, 4, . . . etc., are called natural numbers, denoted by N.

◆ Whole numbers (W)

All natural numbers together with zero are called whole numbers, denoted by W.

$W = \{0, 1, 2, 3, 4, \dots\}$

◆ Integers (Z)

All whole numbers together with negatives of natural numbers are called integers, denoted by Z.

$Z = \{\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots\}$

(i) $-1, -2, -3, -4, \dots$ are called negative integers.

(ii) $1, 2, 3, 4, \dots$ are called positive integers.

Note : Zero is neither positive nor negative.

◆ The numbers of the form $\frac{a}{b}$, where 'a' and 'b' are natural numbers are called **fractions**.

e.g., $\frac{3}{5}, \frac{7}{11}, \frac{13}{213}, \dots$ etc.

◆ The numbers of the form $\frac{p}{q}$, where 'p' and 'q' are integers and 'q' $\neq 0$ are called **rational numbers**, denoted by Q.

e.g., $\frac{-3}{5}, \frac{7}{-11}, \frac{-13}{-213}, \dots$ etc.

Properties of rational numbers

◆ **Closure property of addition:** The sum of two rational numbers is always a rational number.

◆ **Commutative law of addition:** For any two rational numbers 'a' and 'b', $a + b = b + a$.

◆ **Associative law of addition:** For any three rational numbers 'a', 'b' and 'c', $(a + b) + c = a + (b + c)$.

◆ **Existence of additive identity:** Zero is the additive identity.
For any rational number 'a', $a + 0 = 0 + a = a$

- ◆ **Existence of additive inverse:** For each rational number 'a', there exists a rational number '-a' such that $a + (-a) = (-a) + a = 0$. So, $(-a)$ is the additive inverse of 'a'.
- ◆ **Closure property for multiplication:** The product of two rational numbers is a rational number.
- ◆ **Commutative law of multiplication:** For any two rational numbers 'a' and 'b', $ab = ba$.
- ◆ **Associative law of multiplication:** For any three rational numbers 'a', 'b' and 'c', $(ab)c = a(bc)$.
- ◆ **Existence of multiplicative identity:** 1 is called the multiplicative identity.
For any rational number 'a', $1.a = a.1 = a$.
- ◆ **Existence of multiplicative inverse:** Every non-zero rational number 'a' has its multiplicative inverse $\frac{1}{a}$.

Note: Zero is a rational number which has no multiplicative inverse.

- ◆ **Distributive law of multiplication over addition:**
For rational numbers 'a', 'b' and 'c', $a(b + c) = ab + ac$.
- ◆ Rational numbers can be represented on a number line.
- ◆ Between any two rational numbers, there exist infinitely many rational numbers.
- ◆ To find rational numbers between any two given rational numbers, we find their average or mean.

QUESTION BANK

Multiple Choice Questions

A

B

C

D



1 Which of the following statements is true?

- (A) Every fraction is a rational number.
 (B) Every rational number is a fraction.
 (C) Every integer is a rational number.
 (D) Both (A) and (C).

2 Compare $\frac{-8}{9}$ and $\frac{4}{-5}$.

- (A) $\frac{-8}{9} > \frac{-4}{5}$ (B) $\frac{-4}{5} < \frac{-8}{9}$
 (C) $\frac{-8}{9} = \frac{-4}{5}$ (D) $\frac{-8}{9} < \frac{-4}{5}$

3 How is $\frac{-28}{84}$ expressed as a rational number with numerator 4?

- (A) $\frac{4}{7}$ (B) $-\frac{4}{12}$ (C) $\frac{4}{12}$ (D) $\frac{4}{-7}$

4 Which of the following sets of rational numbers is arranged in ascending order?

- (A) $-\frac{5}{14}, -\frac{25}{28}, -\frac{3}{7}, -\frac{1}{2}$
 (B) $-\frac{25}{28}, -\frac{5}{14}, -\frac{3}{7}, -\frac{1}{2}$
 (C) $-\frac{25}{28}, -\frac{1}{2}, -\frac{3}{7}, -\frac{5}{14}$
 (D) $-\frac{1}{2}, -\frac{3}{7}, -\frac{5}{14}, -\frac{25}{28}$

5 Which of the following statements is false?

- (A) $\frac{5}{7} < \frac{7}{9} < \frac{9}{11} < \frac{11}{13}$
 (B) $\frac{11}{13} < \frac{9}{11} < \frac{7}{9} < \frac{5}{7}$

(C) $\frac{5}{7} < \frac{11}{13} < \frac{7}{9} < \frac{9}{11}$

(D) Both (B) & (C)

6 Which of the following is a rational number between $\frac{1}{4}$ and $\frac{1}{3}$?

- (A) $\frac{7}{24}$ (B) $\frac{8}{15}$
 (C) $\frac{13}{48}$ (D) Both (A) & (C)

7 Which of the following is the correct arrangement of $\frac{-11}{15}$, $\frac{-3}{10}$, $\frac{-1}{5}$ and $\frac{13}{20}$ in descending order?

- (A) $\frac{13}{20}, \frac{-1}{5}, \frac{-11}{15}, \frac{-3}{10}$
 (B) $\frac{13}{20}, \frac{-1}{5}, \frac{-3}{10}, \frac{-11}{15}$
 (C) $\frac{13}{20}, \frac{-11}{15}, \frac{-3}{10}, \frac{1}{5}$
 (D) $\frac{13}{20}, \frac{-3}{10}, \frac{-11}{15}, \frac{1}{5}$

8 Simplify $\frac{2}{5} + \frac{8}{3} + \frac{-11}{15} + \frac{4}{5} + \frac{-2}{3}$.

- (A) $\frac{37}{15}$ (B) $-\frac{37}{15}$ (C) $-\frac{36}{5}$ (D) $-\frac{38}{3}$

9 What is the sum of the additive inverse and multiplicative inverse of 2?

- (A) $\frac{3}{2}$ (B) $-\frac{3}{2}$ (C) $\frac{1}{2}$ (D) $-\frac{1}{2}$

10 Subtract $\frac{2}{3}$ from $\frac{7}{8}$.

- (A) $-\frac{5}{24}$ (B) $\frac{5}{24}$ (C) $\frac{7}{16}$ (D) $\frac{5}{16}$

- 11 Which among the following is a rational number equivalent to $\frac{-5}{-3}$?
 (A) $\frac{-25}{15}$ (B) $\frac{25}{-15}$ (C) $\frac{25}{15}$ (D) $\frac{-25}{30}$
- 12 If $\frac{(-3)}{x} = \frac{x}{(-27)}$, what is the positive value of 'x' ?
 (A) -9 (B) 9 (C) -81 (D) 81
- 13 Which number is in the middle if $\frac{-1}{6}$, $\frac{4}{9}$, $\frac{6}{-7}$, $\frac{2}{5}$ and $\frac{-3}{4}$ are arranged in descending order ?
 (A) $\frac{2}{5}$ (B) $\frac{4}{9}$ (C) $\frac{-1}{6}$ (D) $\frac{-6}{7}$
- 14 What is the average of the two middle rational numbers when $\frac{4}{-9}$, $\frac{-6}{9}$, $\frac{5}{9}$, $\frac{-7}{9}$, $\frac{8}{9}$ and $\frac{1}{9}$ are arranged in ascending order ?
 (A) $\frac{1}{8}$ (B) $\frac{2}{7}$ (C) $\frac{-3}{7}$ (D) $\frac{-1}{6}$
- 15 Subtract $\frac{-5}{9}$ from $\frac{-3}{7}$.
 (A) $\frac{62}{63}$ (B) $\frac{8}{63}$ (C) $\frac{-8}{63}$ (D) $\frac{-62}{63}$
- 16 What number should be added to $\frac{-4}{7}$ to get $\frac{5}{9}$?
 (A) $\frac{-71}{63}$ (B) $\frac{71}{63}$ (C) $\frac{1}{63}$ (D) $\frac{-1}{63}$
- 17 What should be subtracted from $\frac{-7}{11}$ to get -2 ?
 (A) $\frac{15}{11}$ (B) $\frac{-15}{11}$ (C) $\frac{29}{11}$ (D) $\frac{-29}{11}$
- 18 By what rational number should $\frac{-3}{5}$ be multiplied to obtain 21 ?
 (A) $\frac{507}{4}$ (B) 35 (C) -35 (D) 507
- 19 The sum of two rational numbers is -3. If one of them is $\frac{-11}{5}$, find the other.
 (A) $\frac{-4}{5}$ (B) $\frac{-8}{5}$ (C) $\frac{4}{5}$ (D) $\frac{8}{5}$
- 20 Which of the following is the resultant of $\frac{1}{12} + \frac{-1}{3} + \frac{-1}{6} + \frac{-5}{7} + \frac{3}{4} + \frac{10}{7}$?
 (A) $1\frac{1}{21}$ (B) -1 (C) 0 (D) 1
- 21 Find four rational numbers between $\frac{1}{6}$ and $\frac{1}{3}$.
 (A) $\frac{-1}{4}$, $\frac{7}{24}$, $\frac{13}{48}$, $\frac{-27}{96}$
 (B) $\frac{1}{4}$, $\frac{-7}{24}$, $\frac{13}{48}$, $\frac{27}{96}$
 (C) $\frac{1}{4}$, $\frac{7}{24}$, $\frac{-13}{48}$, $\frac{27}{96}$
 (D) $\frac{1}{4}$, $\frac{7}{24}$, $\frac{13}{48}$, $\frac{27}{96}$
- 22 Which of the following numbers must be added to $\frac{-5}{16}$ to get $\frac{7}{24}$?
 (A) $\frac{21}{28}$ (B) $\frac{-29}{48}$ (C) $\frac{15}{48}$ (D) $\frac{29}{48}$
- 23 Which of the following numbers must be subtracted from $\frac{7}{-8}$ to get $\frac{-13}{12}$?
 (A) $\frac{5}{24}$ (B) $\frac{9}{24}$ (C) $\frac{-7}{24}$ (D) $\frac{-5}{24}$

24 What is the resultant obtained when the additive inverse of $\frac{5}{6}$ is subtracted from the multiplicative inverse of $\frac{-5}{7} \times \frac{14}{15}$?

- (A) $\frac{3}{2}$ (B) $\frac{-2}{3}$ (C) $\frac{-3}{2}$ (D) $\frac{2}{3}$

25 Which of the following are three rational numbers between -2 and -1 ?

- (A) $\frac{-1}{2}, \frac{-1}{3}, \frac{-1}{5}$ (B) $\frac{-3}{2}, \frac{-7}{4}, \frac{-5}{4}$
 (C) $\frac{-12}{5}, \frac{-22}{5}, \frac{12}{5}$ (D) $\frac{3}{2}, \frac{7}{4}, \frac{5}{4}$

26 What is the simplified form of $\left(\frac{-9}{7} \times \frac{-1}{3}\right) + \left(\frac{15}{8} \times \frac{-4}{5}\right) - \left(\frac{27}{14} \times \frac{2}{9}\right)$?

- (A) $\frac{3}{2}$ (B) $\frac{-3}{7}$ (C) $\frac{-3}{2}$ (D) $\frac{3}{7}$

27 The product of two numbers is $\frac{5}{9}$. If one of the numbers is $\frac{-35}{24}$, find the other.

- (A) $\frac{8}{7}$ (B) $\frac{-8}{21}$ (C) $\frac{-3}{7}$ (D) $\frac{8}{21}$

28 The area of a rectangle is $45 \frac{5}{16} \text{ cm}^2$. If one edge is $6 \frac{1}{4} \text{ cm}$, find the other in cm.

- (A) $7 \frac{1}{8}$ (B) $\frac{7}{4}$ (C) $7 \frac{1}{4}$ (D) $4 \frac{1}{7}$

29 Evaluate $\left(\frac{\frac{1}{6} - \frac{17}{18}}{\frac{5}{7}}\right)$.

- (A) $\frac{49}{45}$ (B) $-1 \frac{4}{45}$ (C) $\frac{45}{49}$ (D) $1 \frac{4}{45}$

30 What is the multiplicative inverse of 0?
 (A) $\frac{1}{0}$ (B) 0

- (C) Does not exist (D) $\frac{0}{0}$

31 Arrange $\frac{-4}{5}, \frac{9}{-15}$ and $\frac{-2}{3}$ in descending order.

- (A) $\frac{9}{-15}, \frac{-2}{3}, \frac{-4}{5}$ (B) $\frac{-2}{3}, \frac{-4}{5}, \frac{-9}{15}$
 (C) $\frac{9}{-15}, \frac{-4}{5}, \frac{-2}{3}$ (D) $\frac{-2}{3}, \frac{-9}{15}, \frac{-4}{5}$

32 Simplify $\frac{4}{7} + 0 + \frac{-8}{9} + \frac{-13}{7} + \frac{17}{21}$.

- (A) $\frac{-56}{63}$ (B) $\frac{-86}{63}$ (C) $\frac{86}{63}$ (D) $\frac{56}{63}$

33 What is the sum of the greatest and the least numbers of $\frac{5}{9}, \frac{1}{9}$ and $\frac{11}{9}$?

- (A) $\frac{2}{9}$ (B) $\frac{4}{9}$ (C) $\frac{4}{3}$ (D) $\frac{2}{3}$

34 Find the value of $\left(\frac{5}{9} + \frac{15}{36}\right) \div \left(\frac{-5}{6}\right)$.

- (A) $\frac{-4}{3}$ (B) $\frac{3}{5}$ (C) $\frac{-8}{5}$ (D) $\frac{-3}{8}$

35 State which of the numbers given in the box are rational.

(i) $\sqrt{2} \times \sqrt{8}$ (ii) $\frac{22}{7}$ (iii) $2\sqrt{3}$ (iv) π

- (A) (i) and (ii) only
 (B) (i) and (iii) only
 (C) (ii) and (iv) only
 (D) (iii) and (iv) only

SOLUTIONS

1. Rational Numbers

Multiple Choice Questions

1. (D) Every rational number is not a fraction. In rational numbers, we use integers and in fractions, we use only natural numbers.

2. (D) Expressing in standard form, we get $\frac{-8}{9} = \frac{-8}{9}$ and $\frac{4}{-5} = \frac{-4}{5}$

Express each rational number with L.C.M as denominator.

L.C.M of 9 and 5 is $9 \times 5 = 45$.

$$\therefore \frac{-8}{9} = \frac{-8 \times 5}{9 \times 5} = \frac{-40}{45},$$

$$\frac{-4}{5} = \frac{-4 \times 9}{5 \times 9} = \frac{-36}{45}$$

Comparing the numerators, we have $-40 < -36$.

$$\therefore \frac{-40}{45} < \frac{-36}{45} \Rightarrow \frac{-8}{9} < \frac{-4}{5}$$

3. (B) The H.C.F of 28 and 84 such that the numerator is 4 is 7.

So, simplify $\frac{28}{84}$ by dividing its numerator and denominator by 7,

$$\text{to get } \frac{-4}{12}.$$

4. (C) Convert the given fractions into equivalent fractions and compare.

$$\frac{-25}{28} < \frac{-1}{2} < \frac{-3}{7} < \frac{-5}{14}$$

5. (D) $\frac{5}{7} = 0.71$; $\frac{7}{9} = 0.77$

$$\frac{9}{11} = 0.81$$
; $\frac{11}{13} = 0.84$

$$\text{So, } \frac{5}{7} < \frac{7}{9} < \frac{9}{11} < \frac{11}{13}.$$

Hence, both (B) and (C) are false.

6. (D) $\frac{1}{4} = 0.25$; $\frac{1}{3} = 0.33$; $\frac{8}{15} = 0.53$

$$\frac{7}{24} = 0.29$$
; $\frac{13}{48} = 0.27$

So, $\frac{7}{24}$ and $\frac{13}{48}$ lie between $\frac{1}{4}$ & $\frac{1}{3}$.

7. (B) 8. (A) 9. (B) 10. (B) 11. (C)

12. (B) $\frac{(-3)}{x} = \frac{x}{(-27)} \Rightarrow x^2 = 81 \Rightarrow x = 9$

13. (C) The descending order is

$$\frac{4}{9}, \frac{2}{5}, \frac{-1}{6}, \frac{-3}{4}, \frac{-6}{7}.$$

\therefore The middle number is $\frac{-1}{6}$.

14. (D) Arranging the given rational numbers in ascending order, we

$$\text{get } \frac{-7}{9}, \frac{-6}{9}, \frac{-4}{9}, \frac{1}{9}, \frac{5}{9}, \frac{8}{9}.$$

The two middle rational numbers

are $\frac{-4}{9}$ and $\frac{1}{9}$.

Their average is

$$\frac{\frac{-4}{9} + \frac{1}{9}}{2} = \frac{-3}{9} \times \frac{1}{2} = \frac{-1}{6}.$$

15. (B) 16. (B) 17. (A) 18. (C) 19. (A)

20. (A) $\frac{1}{12} + \frac{-1}{3} + \frac{-1}{6} + \frac{-5}{7} + \frac{3}{4} + \frac{10}{7}$

$$= \left(\frac{1}{12} - \frac{1}{3} - \frac{1}{6} + \frac{3}{4} \right) + \left(\frac{10}{7} - \frac{5}{7} \right)$$

$$= \left(\frac{1-4-2+9}{12} \right) + \frac{5}{7} = \frac{1}{3} + \frac{5}{7}$$

$$= \frac{22}{21} = 1\frac{1}{21}$$

21. (D) 22. (D) 23. (A) 24. (B)

25. (B) A rational number between any two rational numbers is obtained by taking their average or mean.

∴ A rational number between -2

$$\text{and } -1 \text{ is } \frac{(-2)+(-1)}{2} = \frac{-3}{2}.$$

A rational number between -2 and

$$\frac{-3}{2} \text{ is } \frac{(-2)+\left(\frac{-3}{2}\right)}{2} = \frac{-7}{4}.$$

And a rational number between

$$\frac{-3}{2} \text{ and } -1 \text{ is } \frac{\left(\frac{-3}{2}\right)+(-1)}{2} = \frac{-5}{4}.$$

$$\begin{aligned} 26. \quad (C) \quad & \left(\frac{-9}{7} \times \frac{-1}{3}\right) + \left(\frac{15}{8} \times \frac{-4}{5}\right) - \left(\frac{27}{14} \times \frac{2}{9}\right) \\ & = \frac{3}{7} - \frac{3}{2} - \frac{3}{7} = \frac{-3}{2} \end{aligned}$$

$$27. \quad (B) \quad \text{Product} = \frac{5}{9}$$

$$\text{Given number} = -\frac{35}{24}$$

∴ The other number

$$= \frac{5}{9} + \left(\frac{-35}{24}\right)$$

$$= \frac{\cancel{5}^1}{\cancel{9}^3} \times \frac{\cancel{24}^8}{\cancel{35}_{-7}} = \frac{1 \times 8}{3 \times -7} = \frac{8}{-21}$$

28. (C) Area of the rectangle

$$= 45 \frac{5}{16} \text{ cm}^2 = \frac{725}{16} \text{ cm}^2$$

$$\text{One edge} = 6 \frac{1}{4} \text{ cm} = \frac{25}{4} \text{ cm}$$

$$\text{The other edge} = \left(\frac{725}{16} + \frac{25}{4}\right) = 7 \frac{1}{4} \text{ cm}$$

$$29. \quad (B) \quad \frac{\frac{1}{6} - \frac{17}{18}}{\frac{5}{7}} = \left(\frac{1}{6} - \frac{17}{18}\right) \frac{7}{5} = \left(-1 \frac{4}{45}\right)$$

30. (C) Does not exist since division by zero is not defined.

31. (A) Writing each rational number with a positive denominator, we have

$$\frac{-4}{5}, \frac{-9}{15} \text{ and } \frac{-2}{3}.$$

L.C.M of 5, 15 and 3 is 15.

$$\therefore \frac{-4}{5} = \frac{(-4) \times 3}{5 \times 3} = \frac{-12}{15}$$

$$\frac{-2}{3} = \frac{(-2) \times 5}{3 \times 5} = \frac{-10}{15}$$

Since $-12 < -10 < -9$, we have

$$\frac{-12}{15} < \frac{-10}{15} < \frac{-9}{15} \Rightarrow \frac{-4}{5} < \frac{-2}{3} < \frac{-9}{15}$$

$$\Rightarrow \frac{-9}{15} > \frac{-2}{3} > \frac{-4}{5}.$$

$$32. \quad (B) \quad \frac{4}{7} + 0 + \frac{-8}{9} + \frac{-13}{7} + \frac{17}{21}$$

$$= \left(\frac{4}{7} + 0\right) + \frac{-8}{9} + \frac{-13}{7} + \frac{17}{21}$$

L.C.M of 7, 9 and 21 = $7 \times 3 \times 3$
= 63

$$= \frac{4}{7} + \frac{-8}{9} + \frac{-13}{7} + \frac{17}{21}$$

$$= \left(\frac{4}{7} + \frac{-13}{7}\right) + \frac{-8}{9} + \frac{17}{21}$$

$$= \frac{-9}{7} + \frac{-8}{9} + \frac{17}{21}$$

$$= \frac{-9 \times 9 + (-8) \times 7 + 17 \times 3}{63}$$

$$= \frac{-81 - 56 + 51}{63}$$

$$= \frac{-137 + 51}{63} = \frac{-86}{63}$$

33. (C) The ascending order of given numbers is $\frac{1}{9}, \frac{5}{9}, \frac{11}{9}$.

∴ The required sum

$$= \frac{11}{9} + \frac{1}{9} = \frac{12}{9} = \frac{4}{3}$$

10. (A) Let x be the required number.

$$\text{So, } x + \left(\frac{-3}{5}\right) = -5$$

$$x = -5 + \frac{3}{5} = \frac{-25 + 3}{5} = \frac{-22}{5} = -4\frac{2}{5}$$

SELF ASSESSMENT EXERCISE

MATHEMATICAL REASONING

- Divide the sum of $\frac{65}{12}$ and $\frac{12}{7}$ by their difference.
 (A) $\frac{599}{311}$ (B) $\frac{680}{216}$ (C) $\frac{642}{133}$ (D) $\frac{501}{301}$
- The sum of the additive inverse and multiplicative inverse of $\frac{1}{5}$ is _____.
 (A) $\frac{24}{5}$ (B) $-\frac{24}{5}$ (C) 25 (D) -25
- The product of two rational numbers is $\frac{-28}{81}$. If one of the numbers is $\frac{14}{27}$, then find the other number.
 (A) $\frac{2}{5}$ (B) $\frac{8}{17}$ (C) $-\frac{2}{3}$ (D) $-\frac{4}{3}$
- If $a = 7$, then the value of $-\left(\frac{1-2a}{a-5}\right)$ is _____.
 (A) $-\frac{13}{2}$ (B) $-\frac{15}{2}$ (C) $\frac{13}{2}$ (D) $\frac{15}{2}$
- Which of the following statements is TRUE?
 (A) Every point on the number line represents a rational number.
 (B) The product of a rational number and its reciprocal is 0.
 (C) $(17 \times 12)^{-1} = 17^{-1} \times 12$
 (D) Reciprocal of $\frac{1}{a}$, $a \neq 0$ is a .
- The multiplicative inverse of $-\frac{a}{b}$ is _____.
 (A) $\frac{a}{b}$ (B) $\frac{b}{a}$
 (C) $-\frac{b}{a}$ (D) None of these
- Which of the following properties of rational numbers is given below?

$$\frac{7}{4} \times \left(\frac{-8}{3} + \frac{-13}{12}\right) = \frac{7}{4} \times \frac{-8}{3} + \frac{7}{4} \times \frac{-13}{12}$$
 (A) Commutativity of addition
 (B) Associativity of multiplication
 (C) Distributivity of multiplication over addition
 (D) Distributivity of addition over multiplication
- If $x = \frac{2+3 \times 2}{-5}$, then $|-x|$ is equal to _____.
 (A) $\frac{8}{5}$ (B) $-\frac{8}{5}$ (C) 0 (D) 1
- Which of the following options is true?
 (A) $\frac{5}{7} < \frac{7}{9} < \frac{9}{11} < \frac{11}{13}$ (B) $\frac{11}{13} < \frac{9}{11} < \frac{7}{9} < \frac{5}{7}$
 (C) $\frac{5}{7} < \frac{11}{13} < \frac{7}{9} < \frac{9}{11}$ (D) $\frac{5}{7} < \frac{9}{11} < \frac{11}{13} < \frac{7}{9}$
- The rational number which is not lying between $\frac{5}{16}$ and $\frac{1}{2}$ is _____.
 (A) $\frac{3}{8}$ (B) $\frac{7}{16}$ (C) $\frac{1}{4}$ (D) $\frac{13}{32}$
- Simplify: $\left(\frac{3}{11} \times \frac{5}{6}\right) - \left(\frac{9}{12} \times \frac{4}{3}\right) + \left(\frac{5}{13} \times \frac{6}{15}\right)$
 (A) $-\frac{177}{286}$ (B) $-\frac{303}{40}$ (C) $\frac{289}{492}$ (D) $\frac{17}{24}$

12. What should be subtracted from $\left(\frac{3}{4} - \frac{2}{3}\right)$ to get $\frac{-1}{6}$?
 (A) $-\frac{6}{13}$ (B) $\frac{1}{4}$ (C) $\frac{2}{7}$ (D) $-\frac{1}{8}$
13. Simplify : $\frac{3}{8} + \frac{7}{2} + \left(\frac{-3}{5}\right) + \frac{9}{8} + \left(\frac{-3}{2}\right) + \frac{6}{5}$.
 (A) $-\frac{2}{3}$ (B) $-\frac{41}{10}$ (C) $\frac{39}{5}$ (D) $\frac{41}{10}$
14. If $x = \frac{2}{3}$ and $y = \frac{3}{2}$, then find the value of $(x + y) + (x - y)$.
 (A) $\frac{15}{2}$ (B) $-\frac{13}{5}$ (C) $\frac{17}{6}$ (D) $-\frac{11}{6}$
15. If $x = -\frac{4}{11}$, then which of the following rational number lies between x and $|x|$?
 (A) $\frac{7}{13}$ (B) $-\frac{11}{15}$ (C) $-\frac{2}{11}$ (D) $\frac{5}{8}$

EVERYDAY MATHEMATICS

16. There are 42 students in a class. Out of these, $\frac{3}{4}$ of the boys and $\frac{2}{3}$ of the girls come to school by bus. The total number of boys and girls of the same class who come to school by bus is 30. How many boys are there in the class?
 (A) 20 (B) 24 (C) 26 (D) 16
17. Mrs Priya earns ₹ 18000 per month. She spends $\frac{7}{12}$ on household items and $\frac{1}{8}$ on rest of the things. The amount she saves is _____.
 (A) ₹ 7120 (B) ₹ 5250
 (C) ₹ 5520 (D) ₹ 6562.50
18. One fruit salad recipe requires $\frac{1}{2}$ cup of sugar. Another recipe for the same fruit salad requires 2 tablespoons of sugar. If 1 tablespoon is equivalent to $\frac{1}{16}$ cup, then how much more sugar does the first recipe require?
 (A) $\frac{4}{5}$ cup (B) $\frac{6}{5}$ cup
- (C) $\frac{3}{8}$ cup (D) $\frac{5}{8}$ cup
19. The wingspans of different species of birds is given below.
- | Species of birds | Blue jay | Golden eagle | Seagull | Albatross |
|---------------------|--------------------|------------------|-------------------|------------------|
| Length of wingspans | $\frac{41}{100}$ m | $2\frac{1}{2}$ m | $1\frac{7}{10}$ m | $3\frac{3}{5}$ m |
- How much longer is the wingspan of a Golden eagle than the wingspan of a Blue jay?
 (A) $\frac{209}{100}$ cm (B) $\frac{209}{100}$ m
 (C) $\frac{9}{100}$ m (D) $\frac{215}{100}$ cm
20. There are few adults and children in a restaurant. If $\frac{3}{8}$ of the people in the restaurant are adults and there are 90 more children than adults, then how many children are there in the restaurant?
 (A) 180 (B) 200 (C) 225 (D) 230

ACHIEVERS SECTION (HOTS)

21. Which of the following options is **INCORRECT**?
 (A) The rational number 0 is the additive identity for rational numbers.
 (B) The additive inverse of the rational number a/b is $-a/b$ and vice-versa.
 (C) Rational numbers are closed under the operations of subtraction, multiplication and division.
 (D) There are infinite rational numbers between any two rational numbers.

22. Match the following.

Column-I	Column-II
(P) Product of a rational number and its reciprocal is	(i) -1
(Q) If $\frac{12}{30}$ and $\frac{x}{5}$ are equivalent, then x =	(ii) 0
(R) $\left[\frac{8}{21} + \left(\frac{-32}{39} + \frac{16}{13} \right) \right] \times \frac{7}{4} =$	(iii) 2
(S) Sum of a rational number and its additive inverse is	(iv) 1

(A) (P) → (iv); (Q) → (iii); (R) → (i); (S) → (ii)
 (B) (P) → (i); (Q) → (iii); (R) → (iv); (S) → (ii)
 (C) (P) → (iv); (Q) → (iii); (R) → (ii); (S) → (i)
 (D) (P) → (i); (Q) → (iv); (R) → (iii); (S) → (ii)

23. Fill in the blanks.

- (i) 0 is neither P nor Q.
 (ii) R has/have no reciprocal.
 (iii) The rational numbers S and T are equal to their reciprocal.

	P	Q	R	S	T
(A)	Positive	negative	1	1/2	-1/2
(B)	Integer	rational	0	-1	0
(C)	Positive	negative	0	1	-1
(D)	Natural	integer	-1	1	-1

24. Which of the following options holds?

Statement - 1 : Rational numbers are closed under division.

Statement - 2 : The value of

$$\left(\frac{-7}{18} \times \frac{15}{-7} \right) - \left(1 \times \frac{1}{4} \right) + \left(\frac{1}{2} \times \frac{1}{4} \right) \text{ is } \frac{17}{24}.$$

- (A) Both Statement - 1 and Statement - 2 are true.
 (B) Statement - 1 is true and Statement - 2 is false.
 (C) Statement - 1 is false but Statement - 2 is true.
 (D) Both Statement - 1 and Statement - 2 are false.

25. State 'T' for true and 'F' for false.

- (i) The rational number $\frac{-8}{-3}$ lies neither to the right nor to the left of zero on the number line.
 (ii) The rational numbers $\frac{1}{2}$ and $-\frac{5}{2}$ are on the opposite sides of 0 on the number line.
 (iii) 0 is the smallest rational number.
 (iv) For every rational number x, $x + 1 = x$.

	(i)	(ii)	(iii)	(iv)
(A)	F	T	T	F
(B)	T	F	F	F
(C)	F	T	F	F
(D)	T	T	F	F



Darken your choice with HB Pencil

1. (A) (B) (C) (D)	8. (A) (B) (C) (D)	15. (A) (B) (C) (D)	22. (A) (B) (C) (D)
2. (A) (B) (C) (D)	9. (A) (B) (C) (D)	16. (A) (B) (C) (D)	23. (A) (B) (C) (D)
3. (A) (B) (C) (D)	10. (A) (B) (C) (D)	17. (A) (B) (C) (D)	24. (A) (B) (C) (D)
4. (A) (B) (C) (D)	11. (A) (B) (C) (D)	18. (A) (B) (C) (D)	25. (A) (B) (C) (D)
5. (A) (B) (C) (D)	12. (A) (B) (C) (D)	19. (A) (B) (C) (D)	
6. (A) (B) (C) (D)	13. (A) (B) (C) (D)	20. (A) (B) (C) (D)	
7. (A) (B) (C) (D)	14. (A) (B) (C) (D)	21. (A) (B) (C) (D)	

**ANSWERS :1-A, 2- A ,3-C,4- C, 5-D ,6-C, 7-C, 8-A, 9-A, 10-C, 11-A, 12-B, 13-D, 14-B,
15-C, 16-B, 17-B, 18-C, 19-B, 20-C, 21-C, 22-A, 23-C, 24-C, 25-C** **INDRANIL GHOSH**

