Rational Numbers

QUESTIONS

1. Which of the following statements is incorrect?

(a) A rational number is of the form $\frac{x}{y}$, where x and y are integers and $y \neq 0$.

(b) The product of two negative rational number is negative rational number.

(c) There are infinite rational numbers between any two rational numbers.

(d) All fractions greater than 1 are rational numbers.

2. p: Every fraction is a rational number.

q: Every rational number is a fraction.

Which of the following is correct?

(a) p is true and q is false. (b) p is false and q is true.

(c) Both p and q are true. (d) Both p and q are false.

3. p: All integers are rational numbers.

q: Every rational number is an integer.

Which of the following statements is correct?

(a) p is false and q is true. (b) p is true and q is false.

(c) Both p and q are true. (d) Both p and q are false.

4. Which of the following is not a rational number(s)?

(a) $\frac{-2}{19}$ (b) $\frac{2}{-8}$ (c) $\frac{-3}{-13}$ (d) $\frac{\sqrt{2}}{6}$

5. What type of a number is $\frac{-6}{0}$?

(a) A positive rational number

(b) A negative rational number

(c) Either a positive or a negative rational number

(d) Neither a positive nor a negative rational number

6. Which of the following pairs of numbers is not a pair of equivalent rational numbers?

(a) $\frac{13}{2}$ and $\frac{65}{10}$ (b) $\frac{15}{36}$ and $\frac{63}{108}$ (c) $\frac{4}{5}$ and $\frac{16}{20}$ (d) None of these

7. Which among the following is a rational number equivalent to $\frac{-13}{3}$?

(a) $\frac{-100}{27}$ (b) $\frac{26}{6}$ (c) $\frac{-117}{27}$ (d) $\frac{15}{25}$

8. What type of a numerator does $\frac{0}{9}$ have?

(a) Positive (b) Negative

(c) Either positive or negative (d) Neither positive nor negative

9. How can the rational numbers $\frac{11}{15}, \frac{-11}{12}, \frac{-4}{9}$ and $\frac{7}{12}$ be written in ascending order?

(a) $\frac{-11}{12} < \frac{-4}{9} < \frac{11}{15} < \frac{7}{12}$ (b) $\frac{-11}{12} < \frac{-4}{9} < \frac{7}{12} < \frac{11}{15}$

(c) $\frac{-4}{9} < \frac{-11}{12} < \frac{7}{12} < \frac{11}{15}$ (d) $\frac{-4}{9} < \frac{-11}{12} < \frac{11}{15} < \frac{7}{12}$

10. Which of the following statements is true?

(a) $\frac{5}{-8} > \frac{-20}{32}$ (b) $\frac{5}{-8} = \frac{-20}{32}$ (c) $\frac{5}{-8} < \frac{-20}{32}$ (d) $\frac{5}{6} < \frac{11}{12}$

11. If $\frac{-4}{9} = \frac{-16}{x}$, what is the value of x?

(a) 36 (b) –36 (c) 42 (d) –42

12. Which row is incorrectly matched?

Row	Rational Number	Standard Form
A.	$\frac{22}{-42}$	$\frac{1}{2}$
B.	$\frac{-12}{-21}$	$\frac{4}{7}$
C.	$\frac{27}{30}$	$\frac{9}{10}$
D.	$\frac{-32}{56}$	$\frac{-4}{7}$

(a) Row A (b) Row B (c) Row C (d) Row D

13. Which of the following statements is incorrect?

(a) The number $\frac{5}{2}$ lies between 2 and 3

(b) The number $\frac{11}{12}$ lies between $\frac{5}{6}$ and $\frac{23}{24}$

(c) The number $\frac{3}{4}$ lies between $\frac{2}{3}$ and $\frac{6}{7}$

(d) The number $\frac{5}{9}$ lies between $\frac{2}{3}$ and $\frac{3}{4}$

14. What is the value of the expression $\left[-\frac{17}{18} \times (-3) \times \frac{108}{30}\right]$

(a) $\frac{-108}{10}$ (b) $\frac{62}{5}$ (c) $\frac{51}{5}$ (d) $\frac{17}{33}$

15. Meena's height is $3\frac{5}{6}$ feet. If her sister Gita is $4\frac{6}{7}$ feet tall, then what is the difference between their heights?

(a) $\frac{10}{11}$ feet (b) $1\frac{1}{6}$ feet (c) $\frac{2}{7}$ feet (d) $1\frac{1}{42}$ feet

16. Suprabha purchases $3\frac{1}{2}$ kg of watermelons, $\frac{5}{6}$ kg of apples and $\frac{3}{4}$ kg guavas from a fruit seller. What is the total quantity of fruits purchased by her?

(a) $4\frac{5}{9}$ kg (b) $3\frac{1}{2}$ kg (c) $6\frac{1}{4}$ kg (d) $5\frac{1}{12}$ kg

17. For any two rational numbers a and b, which of the following properties may be correct?

(i) $a < b$ (ii) $a=b$ (iii) $a>b$

(a) Only (i) and (ii) are correct (b) Only (i) and (iii) are correct

(c) Only (ii) and (iii) are correct (d) All (i), (ii) and (iii) are correct

18. $\dfrac{1}{1+\dfrac{1}{5+\dfrac{1}{3}}} =$

(a) $\frac{5}{19}$ (b) $\frac{7}{9}$ (c) $\frac{16}{19}$ (d) None of these

19. The value of A such that $-\frac{5}{8}$ and $\frac{A}{-32}$ are equivalent rational numbers is

(a) 22 (b) -36 (c) 16 (d) 20

20. If a, b, c be rational numbers such that $a > b$ and $c < b$ then.....

(a) $c > a$ (b) $c < a$ (c) $b < c$ (d) $b > a$

21. Of which property is $\frac{-5}{7}+\left(\frac{3}{-11}+\frac{-10}{25}\right)=\left(\frac{-5}{7}+\frac{3}{-11}\right)+\frac{-10}{25}$ an example?

(a) Closure property (b) Commutative property

(c) Associative property (d) Identity property

22. Which of the following statements is correct?

(a) 0 is called the additive identity for rational number

(b) 1 is called the multiplicative identity

(c) The additive inverse of 0 is zero itself.

(d) All the above

23. Which row is correctly matched?

Row	Rational Number	Standard Form
A.	$\frac{-1}{3}$	$\frac{1}{-3}$
B.	$\frac{-3}{11}$	$\frac{3}{11}$
C.	$\frac{2}{11}$	$\frac{-2}{11}$
D.	$\frac{9}{2}$	$\frac{-9}{2}$

(a) Row A (b) Row B (c) Row C (d) Row D

24. The value of $1+\cfrac{1}{1+\cfrac{1}{5-\frac{1}{5}}}$ is.....

(a) $\frac{36}{29}$ (b) $\frac{53}{29}$ (c) $\frac{17}{8}$ (d)None of these

25. Which of the following statements is true?

(a) The reciprocals of numbers 1 and -1 are numbers themselves.

(b) Zero has no reciprocal.

(c) The product of two rational numbers is a rational number.

(d) All the above

26. Name the property of multiplication illustrated by

$$\frac{-3}{7}\times\left(\frac{-6}{11}+\frac{8}{9}\right)=\left(\frac{-3}{7}\times\frac{-6}{11}\right)+\left(\frac{-3}{7}\times\frac{8}{9}\right)$$

(a) Associative property (b) Commutative property

(c) Distributive property (d) Closure property

27. Reena is travelling from her village to another town. The distance between the village & town is $45\frac{3}{4}$ km. She stops to rest after covering a distance of $34\frac{1}{3}$ km. How much distance does she further need to cover to reach the other town?

(a) $11\frac{3}{4}$ km (b) $20\frac{1}{2}$ km (c) $09\frac{5}{12}$ km (d) $11\frac{5}{12}$ km

28. Raju, Suraj and Subhash participated in a long jump competition on their school's sports day. Raju jumped $5\frac{1}{2}$ m. Whiie Suraj jumped $\frac{1}{4}$ m less than Raju. On the other hand, Subhash jumped $1\frac{1}{4}$ m more than Suraj. How long did Subhash jump?

(a) $6\frac{1}{2}$ m (b) 7 m (c) $4\frac{1}{2}$ -m (d) 18 m

29. Evaluate p+q given $P=\left(-6\frac{1}{6}\right)$ and $q=\left(-8\frac{1}{8}\right)$.

(a) $\left(-14\frac{13}{24}\right)$ (b) $\left(-14\frac{7}{24}\right)$ (c) $\left(-3\frac{8}{18}\right)$ (d) $\left(13\frac{19}{24}\right)$

30. For what value of $'x'$ is $\frac{3}{8}-\left(-\frac{17}{4}\right)+x=-1\frac{9}{24}$?

(a) -6 (b) 6 (c) $-\frac{1}{6}$ (d) $+\frac{1}{6}$

31. Determine 'y' so that $y-3\frac{1}{3}=\left(-12\frac{7}{12}\right)$.

(a) $-9\frac{1}{4}$ (b) $3\frac{1}{4}$ (c) $-9\frac{5}{12}$ (d) $9\frac{1}{12}$

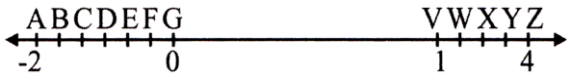
32. Find the simplest form of $\left(-\frac{1}{2}+\frac{1}{3}+\frac{1}{6}\right)\left(\frac{-2}{5}\right)\times\left(36\frac{7}{15}-91\frac{8}{19}+1011\frac{231}{611}\right)$.

(a) 0 (b) $-\frac{1}{2}$ (c) 1 (d) $\frac{2}{5}$

33. Rajeev, Simran and Bhuvik walk around a circular park. They take $\frac{2}{3}h$, $\frac{3}{5}h$ and $\frac{7}{12}$ to complete one round. What is the total time taken by them to complete a round in minutes?

(a) 119 minutes (b) 150 minutes (c) 160 minutes (d) 111 minutes

34. The given figure shows a number line such that AB = BC = CD = DE = EF = FG and VW = WX = XY = YZ



What is the sum of the rational numbers denoted by points D and Y?

(a) $2\frac{1}{5}$ (b) $3\frac{1}{4}$ (c) $8\frac{1}{5}$ (d) $2\frac{1}{4}$

35. By what number should $\frac{-33}{4}$ be divided to get $\frac{-22}{3}$?

(a) $\frac{-4}{3}$ (b) $\frac{8}{9}$ (c) $\frac{9}{8}$ (d) $\frac{-3}{7}$

36. What is the sum of the rational numbers $\frac{3}{13}$ and $\frac{-13}{33}$?

(a) $\frac{39}{106}$ (b) $\frac{-39}{106}$ (c) $\frac{70}{429}$ (d) $-\frac{70}{429}$

37. What should be subtracted from $\frac{-1}{3}$ to get $\frac{1}{6}$?

(a) $\frac{1}{2}$ (b) $\frac{-1}{2}$ (c) $\frac{3}{4}$ (d) $\frac{-3}{4}$

38. What is the reciprocal of the reciprocal of -8?

(a) 64 (b) $\frac{1}{8}$ (c) -8 (d) $\frac{-1}{64}$

39. How many pieces of equal size can be cut from a rope of 90 metres long, each measuring $2\frac{1}{4}$ metres?

(a) 40 (b) 60 (c) 80 (d) 120

40. Given $a=2\frac{6}{7}$, $b=\frac{1}{4}$, $c=\frac{11}{19}$ and $d=\left(-2\frac{1}{4}\right)$ Evaluate $a(b-c)\div d$.

(a) $\frac{500}{1197}$ (b) $\frac{600}{1197}$ (c) $\frac{206}{399}$ (d) $\frac{-38}{57}$

SOLUTIONS

1. (b) Product of two negative number is always positive.

2. (a) Let us consider a fraction $\frac{2}{7}$; this is also a rational number.

However a rational number say, 6 is not a fraction

$\therefore$ 'p' is true, 'q' is false.

3. (b) Since, every integer can have a denominator 1, so it can be expressed in $\frac{p}{q}$ form. Hence statement 'p' is true.

But every rational number, say $\frac{-6}{7}$, is not an integer.

4. (d) $\frac{\sqrt{2}}{3}$ is not a rational number as $\sqrt{2}$ is not an integer

5. (d) Since, denominator is 0, it is not a rational number.

6. (b) $\frac{15}{36}=\frac{5}{12}$ where as $\frac{63}{109}=\frac{7}{12}$

7. (c) $\frac{-117}{27}=\frac{-13\times 9}{3\times 9}=\frac{-13}{3}$

8. (d) Not Available

9. (b) Take LCM of all fraction and compare.

10. (b) $\frac{5}{-8}=\frac{5\times 4}{-8\times 4}=\frac{20}{-32}=\frac{-20}{32}$

11. (a) $\frac{-4}{9}=\frac{-16}{x}$: Cross multiply

$\Rightarrow -4x=-9\times 16$

12. (a) $\frac{22}{-42}=\frac{-22}{42}=\frac{-11}{21}\neq\frac{1}{2}$

13. (d) Take LCM of $\frac{5}{9}, \frac{2}{3}, \frac{3}{4} \Rightarrow \frac{20}{36}, \frac{24}{36}, \frac{27}{36}$ and compare; we can see that $\frac{20}{36}$ does not lie between $\frac{24}{36}$ and $\frac{27}{36}$.

14. (c) $\frac{-17}{18}\times -3\times\frac{108}{\cancel{30}\,10}=\frac{-17}{\cancel{18}}\times(-1)\times\frac{\cancel{108}^{6}}{10}$

$=17\times\frac{\cancel{6}^{3}}{\cancel{10}\,5}=\frac{51}{5}$

15. (d) $4\frac{6}{7}-3\frac{5}{6}$

16. (d) $3\frac{1}{2}+\frac{5}{6}+\frac{3}{4}=\frac{7}{2}+\frac{5}{6}+\frac{3}{4}$

$=\frac{42+10+9}{12}=\frac{61}{12}=5\frac{1}{12}$

17. (d) All possibilities exist: For example if a = $\frac{2}{3}$ b= $\frac{5}{6}$ then a < b

If $a=\frac{4}{6},\ b=\frac{8}{12}\Rightarrow a=b;$ if $a=\frac{13}{12}=\frac{11}{12}$ then $a>b$

18. (c) This problem is always solved from below.

$5+\frac{1}{3}=\frac{16}{3};$ then, $1+\frac{3}{16}=\frac{19}{16};$ then,

$\frac{1}{19/16}=\frac{16}{19}$

19. (d) $\frac{-5}{8}=\frac{-5\times4}{8\times4}=\frac{20}{-32}\Rightarrow A=20$

20. (b) $a>b$ and $c<b\Rightarrow b>c$

Thus, $a>b; b>c\Rightarrow a>b>c\Rightarrow a>c$ or $c<a$

21. (c) Associative property means:

$a+(b+c)=(a+b)+c$

22. (d) All the given statements are correct.

Consider $\frac{1}{7}$.

(a) Since $\frac{1}{7}+0=$ hence $\frac{1}{7}$, is the additive identity of rational numbers.

(b) Since $\frac{1}{7}\times1=\frac{1}{7},1$ is the multiplicative identity of rational number.

(c) Since 0 + 0 = 0, 0 is the additive inverse of 0.

23. (c) Let additive increase of $\frac{2}{11}$ be 'a'

Let then $\frac{2}{11}+a=0\Rightarrow a=\frac{-2}{11}$

24. (b) $5-\frac{1}{5}=\frac{24}{5}$ then $\frac{1}{24/5}=\frac{5}{24}$ then

$1+\frac{5}{24}=\frac{29}{24}$ then, $\frac{1}{29/24}=\frac{24}{29}$ then

$1+\frac{24}{29}=\frac{53}{29}$

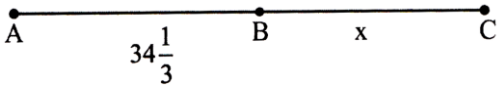
25. (d) Not Available

26. (c) Distributive property means

$a\times(b+c)=(a\times b)+(a\times c)$

or $-a\times(-b+c)=(-a\times -b)+(-a\times c)$

27. (d)



$34\frac{1}{3}+x=45\frac{3}{4}\Rightarrow x=45\frac{3}{4}-34\frac{1}{3}=11\frac{5}{12}$ km

28. (a) Subhash's jump $=5\frac{1}{2}-\frac{1}{4}+1\frac{1}{4}$

$=5\frac{1}{2}+1=6\frac{1}{2}$

29. (b) Given $p+q=\left(-6\frac{1}{6}\right)+\left(-8\frac{1}{8}\right)$

$=\frac{-37}{6}-\frac{65}{8}$

$=\frac{-148-125}{24}$

$=\frac{-343}{24}=-14\frac{7}{24}$

30. (a) $\frac{3}{8}-\left(-\frac{17}{4}\right)+x=-1\frac{9}{24}$

$\Rightarrow x=\frac{-33}{24}-\frac{37}{8}=\frac{-33-111}{24}=\frac{-144}{24}=-6$

31. (a) $y=-12\frac{7}{12}+3\frac{1}{3}=\frac{-151}{12}+\frac{10}{3}$

$=\frac{-151+40}{12}=\frac{-111}{12}=\frac{-37}{4}=-9\frac{1}{4}$

32. (a) : First term $\left(-\frac{1}{2}+\frac{1}{3}+\frac{1}{6}\right)=\frac{-3+1+2}{6}=0$

Now, zero multiplied by any number is zero. This is called mathematical ingenuity.

Otherwise if you evaluate

$\left(36\frac{7}{15}-91\frac{8}{19}+1011\frac{231}{611}\right)$, it is very tedious.

33. (d) Total time taken by Rajeev, Simran and Bhuvik to walk around circular park =

$\left(\frac{2}{3}+\frac{3}{5}+\frac{7}{12}\right)$h= $\left(\frac{40+36+35}{60}\right)$hr. $=\frac{111}{60}$ hr

$=\frac{111}{60}\times 60$ minutes $=111$ minutes

34. (d) Point $D \Rightarrow -1$, Point y = (4 division = 3 units)

$\therefore$ 3 divisions $= \frac{9}{4}$ units

$\therefore$ Point $y = 1 + \frac{9}{4} = \frac{13}{4}$

$\therefore$ D + Y $= -1 + \frac{13}{4} = \frac{9}{4}$

35. (c) Required number $= \frac{-33}{4} \div \frac{-22}{3}$

$= \frac{-33}{4} \times \frac{3}{-22} = \frac{-99}{-88} \times \frac{\cancel{99}}{\cancel{88}_{8}} = \frac{9}{8}$

36. (d) $\frac{3}{13} + \left(\frac{-13}{33}\right) = \frac{3}{13} - \frac{13}{33} = \frac{99 - 169}{429} = \frac{-70}{429}$

37. (b) Let the number to be subtracted be 'x'. Then, $\frac{-1}{3} - x = \frac{1}{6} \Rightarrow \frac{-1}{3} = \frac{1}{6} + x \Rightarrow x = \frac{-1}{3} - \frac{1}{6} = \frac{-2-1}{6} = \frac{-3}{6} = \frac{-1}{2}$

38. (c) Not Available

39. (a) Total length of the rope = 90m.

Length of each piece $= 2\frac{1}{4}$ m.

Number of pieces

$= \frac{90}{2\frac{1}{4}} = \frac{90}{\frac{9}{4}}$ $= \cancel{90}_{10} \times \frac{4}{\cancel{9}} = 40$

40. (a) $a = \frac{20}{7}, b = \frac{1}{4} : C = \frac{11}{19}; d = \frac{-9}{4}$

$a(b-c) \div d = \frac{\frac{20}{7}\left(\frac{1}{4} - \frac{11}{19}\right)}{\left(-9/4\right)} = \frac{20}{7} \times \frac{-4}{9} \rightarrow \times \left(\frac{19 - 44}{76}\right) = \frac{-80}{63} \times \frac{-25}{76} = \frac{\cancel{80}^{20} \times 25}{63 \times \cancel{76}_{19}} = \frac{500}{1197}$

ANSWER - KEYS

1. B	**2.** A	**3.** B	**4.** D	**5.** D
6. B	**7.** C	**8.** D	**9.** B	**10.** B
11. A	**12.** A	**13.** D	**14.** C	**15.** D
16. D	**17.** D	**18.** C	**19.** D	**20.** B
21. C	**22.** D	**23.** C	**24.** B	**25.** D
26. C	**27.** D	**28.** A	**29.** B	**30.** A
31. A	**32.** A	**33.** D	**34.** D	**35.** C
36. D	**37.** B	**38.** C	**39.** A	**40.** A