8th CLASS
MATHEMATICS
IIT FOUNDATION
STUDY MATERIAL

1. Rational number Properties

TEACHING TASK

JEE MAIN LEVEL QUESTIONS:

(1) Rational numbers between -2 and -1

1. $-\frac{5}{3} = -1.666$
2. $-\frac{3}{2} = -1.5.$

Ans: A

(2) $\frac{1}{3}, \frac{-2}{7}, \frac{-4}{3}$

$\frac{1}{3} = 0.33, \quad \frac{-2}{7} = 0.28, \quad -\frac{4}{3} = 1.33.$

Ascending order $= \frac{-2}{7}, \frac{1}{3}, \frac{-4}{3}$

Ans: C

(3)

B) $\frac{-25}{35} = \frac{-5}{7}$ (5, 7)

and $\frac{-55}{77} = \frac{-5}{7}$ (5, 7)

Ans: B

(4) Let 'x' is to subtract from $\frac{-2}{13}$

$$-\frac{2}{13} - x = \frac{5}{2}$$

$$-\frac{2}{13} - \frac{5}{2} = x$$

$$\frac{-2\times2 - 13\times5}{26} = x$$

$$-\frac{4-65}{26} = x$$

$$x = -\frac{69}{26}$$

Ans: A

---

(5) A: The sum of two rational numbers 'p' and 'q' where p and q are positive rational numbers is always rational.

$\therefore$ p+q cannot be irrational.

B: The difference of two positive rational numbers p and q is always rational.

$\therefore$ p-q cannot be irrational.

C: The product of two positive rational numbers p and q is always rational.

$\therefore$ p×q cannot be irrational

D: The quotient of two positive rational numbers p and q is always rational.

$\therefore \frac{p}{q}$ cannot be irrational

Ans: ☆

(6) Rational numbers are numbers that can be expressed as fractions where both the numerator and the denominator are integers, and the denominator is not zero.

Ans: B

---

(7) Let x be the other number,

Given $x \times \left(\frac{-4}{9}\right) = \frac{-28}{27}$

$$x = \frac{-28}{27} \times \frac{1}{(-4)}$$

$$x = \frac{7}{3}$$

Ans: B

---

(8) ☆ Given $\frac{8}{3}, \frac{5}{4}$ and $\frac{-7}{6}$, product is

$$= \frac{8}{3} \times \frac{5}{4} \times \frac{-7}{6}$$

$$= \frac{5 \times (-7)}{3 \times 4 \times 3} = \frac{-35}{36}$$

Ans: ☆

---

(9) ☆ $x = \frac{1}{\sqrt{2}+1}$ and $y = \frac{\sqrt{2}-1}{\sqrt{2}+1}$

$$xy = \frac{1}{\sqrt{2}+1} \times \frac{\sqrt{2}-1}{\sqrt{2}+1}$$

$$= \frac{\sqrt{2}-1}{(\sqrt{2}+1)^2}$$

$$= \frac{(\sqrt{2}-1)}{(\sqrt{2})^2 + 2(\sqrt{2})(1) + 1}$$

$$= \frac{\sqrt{2}-1}{2+2\sqrt{2}+1}$$

$$= \frac{\sqrt{2}-1}{3+2\sqrt{2}}$$

Ans: ☆

(10) Rope length $= 7\frac{2}{3}$ meters

$= \frac{23}{3}$ meters

cost per meter $= 12\frac{3}{4} = \frac{48+3}{4} = \frac{51}{4}$.

cost per $\frac{23}{3}$ meters $= \frac{\frac{51}{4}}{\frac{23}{3}} = \frac{51}{4} \times \frac{3}{23} = \frac{153}{92}$

$\Rightarrow \frac{153}{92} \Rightarrow 1\frac{61}{92}$.

Ans: C

---

(11) Sum of x and y $\Rightarrow x+y = 12$

Product of x and y $\Rightarrow xy = 35$

sum of their Reciprocal $= \frac{1}{x} + \frac{1}{y} = \frac{y+x}{xy}$

$\frac{1}{x} + \frac{1}{y} = \frac{12}{35}$.

Ans: B

---

(12) $\frac{-36}{-216}$ standard form

$\Rightarrow \frac{\cancel{-36}^{\,6}}{\cancel{-216}_{\,36}} = \frac{1}{6}$

Ans: B

---

(13) ★

$-4\frac{3}{4} + 2\frac{7}{12}$

$= \frac{(-4\times4)+3}{4} + \frac{(12\times2)+7}{12}$

$= \frac{-16+3}{4} + \frac{24+7}{12}$

$= \frac{-13}{4} + \frac{31}{12}$

$= \frac{-13\times3+31\times1}{12}$

$= \frac{-39+31}{12}$

$= \frac{-8}{\cancel{12}3}$

$= -\frac{2}{3}$

Ans: ★

(14) Let x be the other number

$\Rightarrow x \times \left(\frac{-4}{15}\right) = \frac{-9}{16}$

$\Rightarrow x = \frac{9}{16} \times \frac{15}{4}$

$= \frac{135}{64}$

Ans: C

---

(15) $\frac{a}{1-b} = \frac{a}{1-b} \times \frac{b}{b} = \frac{ab}{b(1-b)}$

$\frac{ab}{b(1-b)} = \frac{a}{b} \times \frac{b}{(1-b)} = \frac{a}{b}$

Ans: D

---

(16) $p^2 = 2q$, implies that p can indeed be any rational depending on the value of q. for every rational q, there exists a rational p such that $p^2 = 2q$.

Ans: D

---

(17) $x^2 - 3x + 2 = 0$

$x^2 - 2x - x + 2 = 0$

$x(x-2) - 1(x-2) = 0$

$(x-2)(x-1) = 0$

$x = 1$ (or) $x = 2$

$\therefore$ x is an integer.

Ans: B

ADVANCED LEVEL QUESTIONS

Multi correct Answers Type:

① Through statements

A: Rational numbers are closed under addition, which means if you add two rational numbers together, the result will always be a rational number.

D: This directly follows from the previous point. Adding a rational number and an rational number can indeed result in an irrational number.

Ans: A, D

---

② Through statements.

A: Rational numbers are closed under multiplication. when you multiplication. When you multiply two rational numbers, the result will always be a rational number.

C: The product of rational number and irrational number will always be irrational. This is because the irrational component in the product cannot be eliminated by the rational component.

Ans: A, C

---

(3) Through options.

A: The distributive property states that for any rational numbers a, b, and c, $a \times (b+c) = (a \times b) + (a \times c)$.

This property holds true for rational numbers because rational numbers are closed under addition and multiplication.

B: Similarly, for any rational numbers a, b, and c

$$\frac{(a+b)}{c} \times c = \frac{a}{c} \times c + \frac{b}{c} \times c.$$

This distributive property also holds true for rational numbers because multiplication and addition are well-defined operations on rational numbers.

Ans: A, B.

(4) $\frac{1}{2} - \frac{3}{4} + \frac{5}{6} - \frac{7}{8}$

$= \frac{1}{2} + \frac{5}{6} - \frac{3}{4} - \frac{7}{8}$

$= \frac{6 \times 1 + 5 \times 2}{12} - \left(\frac{3 * 8 + 7 \times 4}{32}\right)$

$= \frac{6+10}{12} - \left(\frac{24+28}{32}\right)$

$= \frac{16}{12} - \left(\frac{52}{32}\right)$

$= \frac{4}{3} - \frac{13}{8}$

$= \frac{4 \times 8 - 13 \times 3}{24}$

$= \frac{32 - 39}{24}$

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

Ans: A, C

(5) The reciprocal of (−1) is $\frac{1}{-1} = -1$

The Reciprocal of 1 is $\frac{1}{1} = 1$

The Reciprocal of 2 is $\frac{1}{2} = \frac{1}{2}$, it's not a same.

Ans: B, C

REASON AND ASSERTION TYPE

(6) The assertion true because the sum of two rational number is always rational.

→ The reason is also true because rational number are closed under addition.

Ans: A

---

(7) The assertion is true in most cases but there are exceptions, Ex. If the rational number is 0 the product is 0, which is rational

→ The reason is false because the product of two irrational numbers is not always irrational.

Ans: C

---

(8) The every integer can be expressed as a fraction. $3 = \frac{3}{1}$

The rational include integers by definition.

ASSERTION & REASON TYPE :

(9) Assertion is false. There exist positive rational numbers whose square roots are rational.

Ex: $\sqrt{4} = 2$, $\sqrt{\frac{9}{4}} = \frac{3}{2}$.

Reason is false. There are many rational numbers whose square roots are also rational.

$\sqrt{4} = 2$, $\sqrt{\frac{16}{9}} = \frac{4}{3}$ Ans: D

STATEMENT TYPE :

(10) Statement-I : A standard rational number is typically represented as $\frac{a}{b}$ where, a and b are integers, $b \neq 0$

Statement-II : The denominator of a standard rational number $\frac{a}{b}$ can be any non-zero integer, as long as $b \neq 0$.

Ans: C

---

(11) Statement-I : $\frac{3}{8}$ is indeed a rational number between $\frac{1}{4}$ and $\frac{1}{2}$.

Statement-II : The rational number between two rational number $\frac{a}{b}$ and $\frac{c}{d}$ can be calculated by taking their average. which is $\frac{\frac{a}{b} + \frac{c}{d}}{2}$. Ans: A

COMPREHENSION TYPE :

(12) $\frac{3}{4}$ and $\frac{2}{5}$

Sum : $\frac{3}{4} + \frac{2}{5}$

$= \frac{3\times5+2\times4}{20}$

$= \frac{15+8}{20} \Rightarrow \frac{23}{20}$.

Ans: A

(13) $\frac{3}{4}$ and $\frac{2}{5}$

Subtraction : $\frac{3}{4} - \frac{2}{5}$

$= \frac{3\times5-2\times4}{20}$

$= \frac{15-8}{20}$

$= \frac{7}{20}$

Ans: B

(14) $\frac{3}{4}$ and $\frac{2}{5}$

product : $\frac{3}{\cancel{4}_{2}} \times \frac{\overset{1}{\cancel{2}}}{5} = \frac{3}{2} \times \frac{1}{5} = \frac{3}{10}$

Ans: C

(15) $\frac{3}{4}$ and $\frac{2}{5}$

Divide : $\frac{3}{4} \div \frac{2}{5}$

$= \frac{3}{4} \times \frac{5}{2} \Rightarrow \frac{3\times5}{4\times2} \Rightarrow \frac{15}{8}$

Ans: D

Comprehension:

(16) Through options. Ascending order

A: $\frac{-3}{4} = -0.75$, $\frac{-3}{7} = 0.4$, $\frac{-3}{2} = -1.5$

B: $\frac{-3}{2} = -1.5$, $\frac{-3}{7} = 0.4$, $\frac{-3}{4} = -0.75$

C = $\frac{-3}{7} = -0.4$, $\frac{-3}{4} = -0.75$, $\frac{-3}{2} = -1.5$ Ans: C

D = $\frac{-3}{2} = -1.5$, $\frac{-3}{4} = -0.75$, $\frac{-3}{7} = -0.4$

---

(17) Through options. decreasing order

A: $\frac{-3}{7} = -0.4$, $\frac{-3}{4} = -0.75$, $\frac{-3}{2} = -1.5$

B: $\frac{-3}{2} = -1.5$, $-\frac{3}{4} = -0.75$ $\frac{-3}{7} = -0.4$ Ans: B

C: $\frac{-3}{2} = -1.5$ $\frac{-3}{7} = -0.4$, $\frac{-3}{4} = -0.75$

D: $\frac{-3}{4} = -0.75$, $\frac{-3}{7} = -0.4$ $\frac{-3}{2} = -1.5$

Integer type questions:

(18) $\frac{-5}{8} = \frac{A}{-32}$

To find A cross multiply

$-5 \times (-32) = 8A$

$\frac{5 \times 32^{4}}{8_{1}} = A$

$A = 5 \times 4 \Rightarrow 20.$

---

(19) $\frac{2}{3} \times 60 = 40$

$\frac{3}{5} \times 60 = 36$

$\frac{7}{12} \times 60 = 35$

$\therefore 40+36+35 = 111$ minutes.

(20) $\frac{8}{5}$ is a rational number

it's additive is $-\frac{2}{5}$

$\Rightarrow \frac{2}{5} - \frac{2}{5} = 0$

$\therefore \frac{2}{5}$ and additive inverse is 0.

(21) Matrix matching type questions :

(a) $\frac{1}{-3}$ additive invers is $\frac{1}{3}$. Ans: r

(b) $\frac{-3}{11}$ additive invers is $\frac{3}{11}$ Ans: s

(c) $\frac{2}{11}$ additive invers is $\frac{-2}{11}$ Ans: q

(d) $\frac{9}{2}$ additive invers is $\frac{-9}{2}$ Ans: p

(22)

(a) $\frac{1}{4} \times \left(\frac{2}{3} + \frac{1}{3}\right) \Rightarrow \frac{1}{4} \times \frac{2}{3} + \frac{1}{4} \times \frac{1}{3} \Rightarrow \frac{1}{6} + \frac{1}{12}$

$\Rightarrow \frac{2+1}{12} = \frac{3}{12} = \frac{1}{4}$ Ans: 7

(b) $\frac{5}{2} \div \left(\frac{2}{1} \times \frac{1}{3}\right) = \frac{5}{2} \div \left(\frac{2}{3}\right) \Rightarrow \frac{5}{2} \times \frac{3}{2} = \frac{15}{4}$

Ans: S

(c) $\frac{4}{9} \times \frac{6}{24} \div \frac{2}{3} = \frac{1}{9} \div \frac{2}{3} \Rightarrow \frac{1}{9} \times \frac{3}{2} = \frac{1}{3 \times 2} = \frac{1}{6}$

Ans: P

(d) $\frac{6}{54} \times$ Reciprocal $= \frac{6}{54} \times \frac{54}{6} = 1$ Ans: 2

LEARNERS TASK

conceptual understanding questions (CUQ's)

(1) Where the number is in the form of $\frac{p}{q}$ is called rational number.

$\therefore \frac{3}{2}$ is a rational number.

Ans: 3

---

(2) P is a positive rational number then $\frac{p}{p}$ is calculated as follows

$\frac{p}{p} = 1$

Ans: C

---

(3) $\frac{-192}{108} = \frac{-192 \div 12}{108 \div 12} = \frac{-16}{9}$

$\frac{-16}{9}$ as $\frac{64}{d}$

$\Rightarrow \frac{-16}{9} = \frac{64}{d} \Rightarrow -16 \times d = 64 \times 9$

$d = \frac{-\cancel{64}^{4} \times 9}{\cancel{16}} \Rightarrow d = -4 \times 9 \Rightarrow d = -36.$

$\therefore \frac{-192}{108}$ can be expressed as $\frac{64}{-36}$ Ans: A

---

(4) $\frac{\cancel{132}^{66}}{\cancel{-428}^{214}} = \frac{\cancel{66}^{33}}{\cancel{-214}^{107}} = \frac{33}{-107}$ Ans: A

---

(5) $\frac{15}{36}$ and $\frac{63}{108}$

$\Rightarrow \frac{\overset{5}{\cancel{15}}}{\underset{12}{\cancel{36}}} = \frac{5}{12}$

$\Rightarrow \frac{\overset{21}{\cancel{63}}}{\underset{36}{\cancel{108}}} = \frac{\overset{7}{\cancel{21}}}{\underset{12}{\cancel{36}}} = \frac{7}{12}$

Ans: B

(6) Given $a > b > c$

through options $a > c$

Ans: B

(7) $\frac{-5}{7} + \left(\frac{3}{-11} + \frac{-10}{25}\right) = \left(\frac{-5}{7} + \frac{3}{-11}\right) + \frac{-10}{25}$.

The above equation it is in the form of Associative property $a+(b+c) = (a+b)+c$

Ans: C

(8) All statements are correct.

A): The adding 0 to any rational number does not change the value of that number.

B: The multiplying any rational number by 1 does not change the value of that number.

C: The additive inverse of a number is what you add to it to get zero and adding 0 to 0 gives 0.

Ans: D

(9) A: The reciprocal of 1 is 1 and the reciprocal of 1 is -1.

B: There is no number that can be multiplied by 0 to get 1.

C: The set of rational numbers is closed under multiplication.

Ans: D

---

(10) $\frac{0}{-6} = 0$.

The value of this fraction is 0. Zero is neither positive nor negative Ans: D

---

(11) $\frac{39}{-\frac{117}{9}} = \frac{13}{-\frac{39}{3}} = -\frac{13}{3}$ Ans: C

---

(12) $\frac{-4}{9} = \frac{-16}{x}$ (cross multiply)

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

$x = \frac{\cancel{16}^{4} \times 9}{\cancel{-4}_{1}}$ Ans: A

$x = 4 \times 9$

$x = 36$.

JEE MAINS LEVEL QUESTIONS

① $\frac{a}{b} + \frac{b}{a}$

common denominator

$= \frac{a \times a + b \times b}{a \times b} \Rightarrow \frac{a^2 + b^2}{ab}$

Ans: D

---

② ★ $x = \frac{2}{3}$ and $y = \frac{5}{4}$

then $xy = \frac{1}{3} \times \frac{5}{4_2} \Rightarrow \frac{5}{6}$

$yx = \frac{5}{4_2} \times \frac{1}{3} = \frac{5}{6}$

Ans: ★

$\therefore xy - yx = \frac{5}{6} - \frac{5}{6} = 0$

---

③ $\frac{\frac{1}{p}}{\frac{q}{1}} \times \frac{\frac{1}{q}}{\frac{p}{1}} = 1$

Ans: A

---

④ ★ $x = \frac{p}{2}$ and $y = \frac{q}{r}$

then $xy = \frac{p}{q} \times \frac{q}{r} = \frac{p}{r}$

$yx = \frac{q}{r} \times \frac{p}{q} = \frac{p}{r}$

$xy - yx = \frac{p}{r} - \frac{p}{r} = 0$

Ans: ★

---

(5) $a^2+b^2+c^2 = (a+b+c)^2 - 2(ab+bc+ca)$

Given that $a+b+c=0$, $a^2+b^2+c^2=10$

$10 = (0)^2 - 2(ab+bc+ca)$

$10 = -2(ab+bc+ca)$

$ab+bc+ca = \frac{10}{-2} = -5$.

Ans: B

(6) For a polynomial equation

$ax^n + bx^n(n-1) + k = 0$

In this given polynomial

$x^3+5x^2+8x+4=0$

$\Rightarrow$ The coefficient of x^3 Leading coefficient is 1.

$\Rightarrow$ The coefficient of x^2 is 5.

$-\frac{b}{a} = \frac{-5}{1} = -5$.

Ans: A

(7) Sum of $\frac{-5}{6}$ and $-1\frac{3}{5}$ is

$-\frac{5}{6} + (-1\frac{3}{5}) = (-\frac{5}{6} - \frac{8}{5})$

$\Rightarrow \frac{-25-48}{30} \Rightarrow \frac{-73}{30}$

Sum of $2\frac{2}{3}$ and $-6\frac{2}{5}$

$\Rightarrow 2\frac{2}{3} + (-6\frac{2}{5}) \Rightarrow \frac{8}{3} - \frac{32}{5}$

$\Rightarrow \frac{40-96}{15} = -\frac{56}{15}$

Subtraction $= \frac{-56}{15} - (\frac{-73}{30})$

$= \frac{-56}{15} + \frac{73}{30}$

$= \frac{73+(-56\times 2)}{30}$

$= \frac{73-112}{30}$

$= \frac{-39}{30} = \frac{-13}{10}$

Ans: A

(8) $\left(\frac{3}{7}\times\frac{-5}{8}\right)\div\left(\frac{1}{3}\times\frac{5}{6}\right)+\left(\frac{1}{2}+\frac{1}{5}\right)$

$= \left(\frac{-15}{56}\right)\div\left(\frac{5}{18}\right)+\frac{7}{10}$

$\Rightarrow \frac{-\cancel{15}^{3}}{\cancel{56}_{28}}\times\frac{\cancel{18}^{9}}{\cancel{5}_{1}}+\frac{7}{10}$

$\Rightarrow \frac{-27}{28}+\frac{7}{10}$

$\Rightarrow \frac{7\times28-27\times10}{280}$ Ans: C

$= \frac{196-270}{280} = \frac{-\cancel{74}^{37}}{\cancel{280}_{140}} = \frac{-37}{140}$

---

(9) $\frac{\cancel{2}^{1}}{\cancel{9}_{1}}\times\frac{\cancel{27}^{3}}{\cancel{8}_{4}} = \frac{3}{4}$. Ans: B

---

(10) $\frac{-7}{8}-\left(\frac{-5}{6}\right)$

$\Rightarrow \frac{-7}{8}+\frac{5}{6}$

$\Rightarrow \frac{5}{6}-\frac{7}{8}$

$= \frac{40-42}{48}$

$= \frac{-\cancel{2}^{1}}{\cancel{48}_{24}} \Rightarrow \frac{-1}{24}$ Ans: A

---

(11) $\frac{-2}{3} = 0.66$, $\frac{4}{5} = 0.8$, $\frac{6}{7} = 0.85$, $\frac{-1}{6} = -0.16$

$\frac{-2}{3} < \frac{-1}{6} < \frac{4}{5} < \frac{6}{7}$ Ans: D

---

(12) Rational numbers between $-\frac{2}{3}$ & -1

$-1 - \left(-\frac{2}{3}\right) = -1 + \frac{2}{3} = -\frac{3}{3} + \frac{2}{3} = -\frac{1}{3}$

Now, divide this difference by 6,

$\frac{-1/3}{6} = -\frac{1}{18}$

∴ the five rational number between $-\frac{2}{3}$ and -1 are

$-\frac{13}{18}, -\frac{7}{9}, -\frac{8}{9}, -\frac{17}{18}, -1$ Ans: B

---

(13) $\frac{5}{7} \times x = \frac{10}{7}$

$x = \frac{10^{2}}{\cancel{7}_{1}} \times \frac{\cancel{7}^{1}}{\cancel{5}_{1}}$ Ans: A

$x = 2.$

---

(14) $\frac{-1}{3} = -0.33$, $\frac{-4}{3} = -1.33$, $\frac{-2}{9} = -0.22$

descending order $\Rightarrow$ $\frac{-2}{9} > \frac{-1}{3} > \frac{-4}{3}$ Ans: A

---

(15) $\frac{-17}{18} \times \left(\frac{-3}{1}\right) \times \frac{108}{30} = \frac{17 \times 18}{30} = \frac{17 \times 6}{5} = \frac{17 \times 3}{5} = \frac{51}{5}$.

Ans: B

(16) Water melon = $3\frac{1}{2}$ kg $\Rightarrow \frac{7}{2}$ kg

Apple = $\frac{5}{6}$ kg

grapes = $\frac{3}{4}$ kg

Total weight = $\frac{7}{2} + \frac{5}{6} + \frac{3}{4} \Rightarrow \frac{7\times6 + 5\times2 + 3\times3}{12}$

$\Rightarrow \frac{42+10+9}{12} \Rightarrow \frac{61}{12} \Rightarrow 5\frac{1}{12}$ kg. Ans: D

ADVANCED LEVEL QUESTIONS

Multicorrect answer type:

(1) A: This applies to both addition and multiplication.

B: For multiplication, the identity element is 1 as

$a \times 1 = a$

C: For multiplication the inverse of a is $\frac{1}{a}$

Since $a \times \frac{1}{a} = 1$

D: The set of rational number is closed under multiplication, meaning the product of any two rational number is also a rational number.

Ans: A, B, C, D

(2) A: The set of rational number is closure under addition and subtraction.

B: Addition and subtraction of rational number are associative, $\left(\frac{a}{b}+\frac{c}{d}\right)-e/f = \frac{a}{b}+\left(\frac{c}{d}-\frac{e}{f}\right)$

Ans: A and B.

---

(3) A: Every integer n can be expressed as $\frac{n}{1}$.

C: A fraction is a quotient of two integers, where the denominator is not zero.

D: Every rational number can be expressed as a fractional of two integers, where the denominator is not zero.

Ans: A, C and D.

---

(4) commutative property: addition $\Rightarrow a+b=b+a$

Multiplication $\Rightarrow a\times b=b\times a$

Associative property: Addition $\Rightarrow (a+b)+c=a+(b+c)$

Multiplication $\Rightarrow (a\times b)\times c=a\times(b\times c)$

Identity element: Addition: The identity element is 0 because $a+0=0+a=a$.

Multiplication: $(a\times 1)=1\times a=a$.

Distributive property: $a\times(b+c)=(a\times b)+(a\times c)$

Ans: A, B, C and D

REASON AND ASSERTION TYPE

(5) The sum of two rational number is always rational because rational numbers are closure under addition.

Reason: The sum of a rational number and an irrational number is always irrational.

Ans: B

---

(6) Assertion: The square of any rational number is rational because the product of two rational numbers is rational.

Reason: The square root of a positive rational number is not necessarily rational.

Ans: C

---

(7) Assertion: The set of rational numbers is closur under subtraction.

Reason: The difference of two rational number is always a rational number.

Statement Type:

(9) Statement-I : Between any two rational numbers, you can always find another rational number and this process can be repeated indefinitely, showing that there are infinitely many rational numbers between any two given ration numbers.

Statement-II: The product of two negative rational numbers is a positive rational number because multiplying two negative numbers results in a positive number. Ans: C

Comprehension Type:

(10) The additive inverse of a rational number 'a' is '-a'.

∴ the sum of a rational number and its additive inverse is $a+(-a)=0$.

Ans: A

---

(11) $\frac{3}{5}$ and $\frac{4}{7}$

product : $\frac{3}{5} \times \frac{4}{7} = \frac{12}{35}$ Ans: B

---

(12) Area of Rectangle $= l \times b$

$= 18\frac{2}{5} \times 12\frac{1}{2}$

$= \frac{((18\times5)+2)}{5} \times \frac{((12\times2)+1)}{2}$

$= \frac{\cancel{92}^{46}}{\cancel{5}_{1}} * \frac{\cancel{25}^{5}}{\cancel{2}_{1}}$

$= 46 \times 5$

$= 230\ m^2$

Ans: B

Integer Type:

(13) $2 - \frac{3}{4} \div \left(\frac{-2}{3}\right)$

$= 2 + \frac{\cancel{3}^{1}}{\cancel{4}_{2}} \times \frac{\cancel{2}^{1}}{\cancel{3}_{1}}$

$= 2 + \frac{2}{2} \Rightarrow \frac{4+2}{2}$.

---

(14) $2\frac{1}{4} = 2 + \frac{1}{4} = \frac{8}{4} + \frac{1}{4} = \frac{9}{4}$ meters

Number of pieces $= \frac{90}{9/4} \Rightarrow \cancel{90}^{10} \times \frac{4}{\cancel{9}_{1}} \Rightarrow 10 \times 4 = 40$

$\therefore$ 40 pieces of $2\frac{1}{4}$ meters can be cut from a 90 meters long rope.

Matrix matching type:

(15)

(a) $\frac{\cancel{22}^{11}}{\cancel{42}_{21}} = \frac{11}{21}$ ans: q

(b) $\frac{\cancel{12}^{4}}{\cancel{21}_{7}} = \frac{4}{7}$ Ans: p

(c) ☆ $\frac{\cancel{27}^{9}}{\cancel{30}_{10}} = \frac{9}{10}$ Ans: s ☆

(d) $\frac{\cancel{32}^{4}}{\cancel{56}_{7}} = -\frac{4}{7}$ Ans: r