

1. RATIONAL NUMBERS ①
PROPERTIES AND
OPERATIONS 2025-26
Class: VIII; MATHEMATICS
INTEGRATED + SOLUTIONS

TEACHING TASK
JEE MAINS LEVEL

Q1. A) Given numbers -2 and -1
option verification.

$$A) -\frac{5}{3} = -1.6 \checkmark$$

$$B) -\frac{3}{2} = -1.5$$

Ans. A

Q2 $\frac{1}{3}, \frac{-2}{7}, \frac{-4}{3}$

L.C.M of 3, 7, 3 = 21

$$\frac{1}{3} = \frac{7}{21}; \quad \frac{-2}{7} = \frac{-6}{21}; \quad \frac{-4}{3} = \frac{-28}{21}$$

$$\therefore \frac{-28}{21} < \frac{-6}{21} < \frac{7}{21}$$

$$\therefore \frac{-4}{3} < \frac{-2}{7} < \frac{1}{3}$$

Ans: B

03

$$B) \frac{-25}{25} = -\frac{5}{5}; \frac{-55}{17} = -\frac{5}{7}$$

Ans. B (2)

04

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

$$\Rightarrow x = -\frac{2}{13} - \frac{5}{2} = \frac{-4-65}{26} = \frac{-69}{26}$$

Ans. A

05

$$p > 0, q > 0 \Rightarrow p+q > 0 \text{ and } p \cdot q > 0$$

Ans. D

06

Rational $\times$ Rational = Rational

Ans. B

07.

$$x \times -\frac{4}{9} = -\frac{28}{27}$$

$$\Rightarrow x = \frac{-28}{27} \times \frac{-9}{4} = \frac{7}{3}$$

Ans. B

08

$$\frac{2}{3} \times \frac{5}{4} \times \frac{-7}{6} = -\frac{35}{36}$$

Ans. A

09

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

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

(Note: These are Irrational Numbers)

Ans. A

10.

$$\text{Cost per meter} = \text{Rs } \frac{12\frac{3}{4}}{7\frac{2}{3}} = \frac{51}{4} \times \frac{3}{23}$$

$$= \frac{153}{92} = 1\frac{61}{92}$$

Ans. C

11.

$$\begin{aligned}
 x+y &= 12 \rightarrow \textcircled{1} \\
 xy &= 35 \rightarrow \textcircled{2} \\
 \frac{x+y}{xy} &= \frac{12}{35} \\
 \textcircled{1} \Rightarrow \frac{1}{x} + \frac{1}{y} &= \frac{12}{35}
 \end{aligned}$$

Ans: B

Ans: B

$$12 \quad \frac{-36}{-216} = \frac{1}{6}$$

$$13 \quad -4\frac{3}{4} + 2\frac{7}{12}$$

$$\begin{aligned}
 &= -\frac{19}{4} + \frac{31}{12} \\
 &= \frac{-57+31}{12} = \frac{-26}{12} = -\frac{13}{6}
 \end{aligned}$$

Ans: C

14

$$\begin{aligned}
 2x - \frac{y}{15} &= -\frac{9}{16} \\
 \Rightarrow x &= \frac{9}{16} \times \frac{15}{y} = \frac{135}{64}
 \end{aligned}$$

Ans: C

15

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

Ans: —

16

$$4^2 = 16 = 2 \times 8$$

 $p^2 = 2q \Rightarrow p$ is a perfect square Ans: B

17

$$\begin{aligned}
 x^2 - 3x + 2 &= 0 \\
 x &= \frac{3 \pm \sqrt{9-8}}{2}
 \end{aligned}$$

17

$$x^2 - 3x + 2 = 0$$

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

$$\Rightarrow x = 1, 2$$

Ans: B

④

JEE ADVANCED LEVEL

Ans: A

01. Conceptual

Ans: A, C

02. Conceptual

Ans: A, B

03. Conceptual

$$\frac{1}{2} - \frac{3}{4} + \frac{5}{6} - \frac{7}{8} = \frac{12 - 18 + 20 - 21}{24} = \frac{-7}{24} = -\frac{14}{48}$$

04

Ans: A, C

05. -1 and 1

Ans: B, C

06. Assertion: Conceptual (True)
Reason: Conceptual (True)

Ans: A

07. Assertion: Conceptual (True)
Reason: $\sqrt{2} \times 3\sqrt{2} = 6 \rightarrow$ rational (False)

Ans: C

08. Assertion: Conceptual (True)
Reason: Conceptual (True)

Ans: A

09. Assertion: Conceptual (False)
Reason: Conceptual (~~False~~ True)

Ans: D

10	Statement I: Conceptual (True) Statement II: Conceptual (False) Ans: C
11	Statement I: $\frac{\left(\frac{1}{u} + \frac{1}{v}\right)}{2} = \frac{\left(\frac{1}{u} + \frac{1}{v}\right)}{2}$ (True) Statement II: Conceptual (True) Ans: A
12	$\frac{3}{4} + \frac{2}{5} = \frac{15+8}{20} = \frac{23}{20}$ Ans: A
13	$\frac{2}{5} - \frac{3}{4} = \frac{8-15}{20} = -\frac{7}{20}$ Ans: —
14	$\frac{3}{4} \times \frac{2}{5} = \frac{6}{20} = \frac{3}{10}$ Ans: C
15	$\frac{\left(\frac{3}{4}\right)}{\left(\frac{2}{5}\right)} = \frac{3}{4} \times \frac{5}{2} = \frac{15}{8}$ Ans: D
16	$-\frac{3}{7}, -\frac{3}{2}, -\frac{3}{4}$ L.C.M. of 7, 2, 4 = 28 $-\frac{3}{7} \times \frac{4}{4} = -\frac{12}{28}$; $-\frac{3}{2} \times \frac{14}{14} = -\frac{42}{28}$ $-\frac{3}{4} \times \frac{7}{7} = -\frac{21}{28}$ Ans: $-\frac{42}{28} < -\frac{21}{28} < -\frac{12}{28}$ $-\frac{3}{2} < -\frac{3}{4}$ Ans: D

6

Ans: A

17 Descending order:

$$-\frac{3}{4} > -\frac{3}{2} > -\frac{3}{2}$$

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

Ans: 20

$$\Rightarrow A = 20$$

19 $\frac{2}{3} + \frac{3}{5} + \frac{7}{12}$

$$= \frac{40 + 36 + 35}{60} = \frac{111}{60} \text{ hr} = 11 \text{ min} \text{ Ans: 111}$$

Ans: 0

20. Conceptual $\frac{2}{5} + (-\frac{2}{5}) = 0$

21 a) $-\frac{1}{3} \rightarrow \frac{1}{3}$

b) $-\frac{3}{11} \rightarrow \frac{3}{11}$

c) $\frac{2}{11} \rightarrow -\frac{2}{11}$

d) $\frac{9}{2} \rightarrow -\frac{9}{2}$

Ans: R, S, Q, P

22 A) $\frac{1}{4} \times (\frac{2}{3} + \frac{1}{3}) = \frac{1}{4} \times 1 = \frac{1}{4} (R)$

B) $\frac{5}{2} \div (\frac{2}{3}) = \frac{5}{2} \times \frac{3}{2} = \frac{15}{4} (S)$

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

d) $\frac{6}{24} \times \frac{24}{6} = 1 (Q)$

Ans: R, S, P, Q

LEARNERS TASK (Ques)

7

01	$\frac{3}{2}$	Ans: B
02	1	Ans: A
03	$\frac{-192}{108} = \frac{-64}{36}$	Ans: B
04	$\frac{132}{-428} = \frac{-33}{107}$	Ans: B
05	B) $\frac{15}{36} = \frac{5}{12}$; $\frac{63}{108} = \frac{21}{36} = \frac{7}{12}$	Ans: B
06	$5 > \frac{3}{a}$, $\frac{2}{c} < \frac{3}{b} \Rightarrow 5 > \frac{2}{a} \Rightarrow a > \frac{2}{5}$	Ans: B
07	Conceptual	Ans: C
08	Conceptual	Ans: D
09	Conceptual	Ans: D
10	$\frac{0}{-6} = 0$	Ans: D
11	$\frac{-13}{3} = \frac{-13 \times 9}{3 \times 9} = -\frac{117}{27}$	Ans: C
12	$-\frac{4}{9} = -\frac{16}{\lambda} \Rightarrow \lambda = 36$	Ans: A

8

JEE MAINS LEVEL

01 $\frac{a}{b} + \frac{b}{a} = \frac{a^2 + b^2}{ab}$ Ans: D

02 $xy = \frac{2}{3} \times \frac{5}{4} = \frac{5}{6}$ Ans: D
 Now $xy + yx = 2xy = 2 \times \frac{5}{6} = \frac{5}{3}$

03 $\frac{p}{q} \times \frac{q}{p} = 1$ Ans: A

Ans: D

04 $xy - yx = 0$

05 $(a+b+c)^2 = a^2 + b^2 + c^2 + 2(ab+bc+ca)$
 $\Rightarrow 0^2 = 10 + 2(ab+bc+ca)$
 $\Rightarrow ab+bc+ca = -5$ Ans: A

Ans: A

06 $x^3 + 5x^2 + 8x + 4 = 0$
 $ax^3 + bx^2 + cx + d = 0$

Ans: A

Sum $= -\frac{b}{a} = -\frac{5}{1} = -5$
 $-\frac{5}{6} + (-1\frac{3}{5}) = -\frac{5}{6} - \frac{8}{5} = \frac{-25-48}{30} = \frac{-73}{30}$
 $2\frac{2}{3} + (-6\frac{2}{5}) = \frac{8}{3} - \frac{32}{5} = \frac{40-96}{15} = \frac{-56}{15}$

Now, $\left(-\frac{56}{15}\right) - \left(-\frac{73}{30}\right) = \frac{-39}{30}$
 $= -\frac{13}{10}$ Ans: A

08

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

9

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

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

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

$$= -\frac{37}{140}$$

Ans: C

$$\frac{2}{9} \times \frac{27}{8} = \frac{3}{4}$$

Ans: B

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

$$= \frac{-21+20}{24} = -\frac{1}{24}$$

Ans: A

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

~~L.C.M of 3, 5, 7, 6 = 210~~

$$-\frac{2}{3} = -0.66; \quad \frac{4}{5} = 0.8;$$

$$\frac{6}{7} = 0.85, \quad -\frac{1}{6} = -0.15$$

We have $-0.66 < -0.15 < 0.8 < 0.85$

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

Ans: D

Short cut method not to be please, Note:

10

$$-\frac{2}{3} = -0.67, -1.$$

Now, option verification B

$$-\frac{13}{18} = -0.72 \checkmark \quad \left| \quad -\frac{7}{9} = -0.77 \checkmark \right.$$

$$-\frac{5}{6} = -0.83 \checkmark \quad \left| \quad -\frac{8}{9} = -0.88 \checkmark \right.$$

$$-\frac{17}{18} = -0.94 \checkmark$$

Ans. B

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

$$\Rightarrow x = \frac{10}{7} \times \frac{7}{5} = 2$$

Ans. A

14 $-\frac{1}{3} \times \frac{2}{3} = -\frac{2}{9}$

$$; -\frac{4}{3} \times \frac{2}{3} = -\frac{8}{3} = -\frac{12}{9}$$

$$; -\frac{2}{9}$$

Clearly $-\frac{2}{9} > -\frac{8}{3} > -\frac{12}{9}$

$$-\frac{2}{9} > -\frac{1}{3} > -\frac{4}{3}$$

Ans. A

15

$$-\frac{17}{18} \times (-3) \times \frac{168}{30} = \frac{51}{5}$$

Ans. B

16

$$3\frac{1}{2} + \frac{5}{6} + \frac{3}{4}$$

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

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

Ans. D



JEE ADVANCED LEVEL

11

01.	Conceptual	Ans: A, B, C, D
02.	Conceptual	Ans: B
03.	Conceptual	Ans: A, C
04.	Conceptual	Ans: A, B, C, D
05.	Assertion: Conceptual (True) Reason: Conceptual (True)	Ans: A
06.	Assertion: Conceptual (True) Reason: Conceptual (True)	Ans: A
07.	Assertion: Conceptual (True) Reason: Conceptual (True)	Ans: A
08.	Statement I: Conceptual (True) Statement II: Conceptual (False) $-1 \times -1 = 1$	Ans: C
09.	Conceptual	Ans: A
10.	$\frac{3}{5} \times \frac{4}{7} = \frac{12}{35}$	Ans: B
11.	Area = $18 \frac{2}{5} \times 12 \frac{1}{2}$ $= \frac{92}{5} \times \frac{25}{2} = 230 \text{ m}^2$	Ans: B



12

$$\left[2 - \frac{3}{4} \times \left(-\frac{2}{3} \right) \right] \times \frac{2}{5}$$

$$= \left(2 + \frac{1}{2} \right) \times \frac{2}{5} = 1$$

Ans: 1

Ans: 40

$$\text{Ans} = \frac{90}{\left(\frac{1}{4} \right)} = \frac{90}{\left(\frac{1}{4} \right)} = 40$$

14

A) $\frac{-22}{42} = \frac{-11}{21} \quad (Q)$

B) $\frac{-12}{-21} = \frac{4}{7} \quad (P)$

C) $\frac{21}{30} = \frac{7}{10} \quad (S)$

D) $\frac{-32}{56} = \frac{-4}{7} \quad (R)$

Ans: Q, P, S, R

$\Rightarrow$ THE END $\in$