

OPERATIONS ON FRACTIONS

①

Class: VI, IIT FOUNDATION
MATHEMATICS ; SOLUTIONS

TEACHING TASK

01. $x + \frac{1}{3} = \frac{7}{12}$

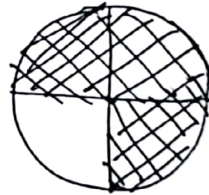
$$\Rightarrow x = \frac{7}{12} - \frac{1}{3}$$

$$= \frac{7-4}{12} = \frac{3}{12} = \frac{1}{4}$$

Ans: A

02. $\frac{3}{4}$ cake ~~is~~ shared by 5

Remaining cake is $= \frac{1}{4}$.



$\therefore \frac{1}{5}$ recies the original cake by each friend

Ans B

03 Ann eats $= \frac{7}{16}$

Tegs eats $= \frac{1}{4} \times \frac{4}{4} = \frac{4}{16}$

$\therefore$ Total cake 16 equal parts

$$\frac{7}{16} + \frac{4}{16} + x = 16 \text{ equal parts}$$

$$\Rightarrow \frac{11}{16} + \frac{7}{16}$$

$\therefore$ clearly $x = \frac{7}{16}$

Ans: B

04. $\left(\frac{10^2}{5} \times \frac{3}{6}\right) + \left(\frac{2}{3} \times \frac{6}{2}\right) - \frac{8}{4}$ of $\frac{14}{7}$ (2)

$$= \left(\frac{30}{30}\right) + \left(\frac{12}{6}\right) - \frac{8}{4} \text{ of } 2$$

$$= (1 + 2 - 2) \text{ of } 2$$

$$= 1 \text{ of } 2$$

$$= 2$$

Ans: —

05. $\left[\frac{5}{4} * \left(\frac{6}{10} \times \frac{5}{4}\right) - \left(\frac{3}{4} \times \frac{4}{6}\right) + \frac{1}{2}\right] \text{ of } \frac{3}{4}$

$$= \left[\frac{5}{4} + \frac{30}{40} - \cancel{\frac{1}{2}} + \cancel{\frac{1}{2}}\right] \text{ of } \frac{3}{4}$$

$$= \left[\frac{8}{4}\right] \text{ of } \frac{3}{4}$$

$$= \frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$$

Ans: B

06. $12\frac{1}{2} + 12\frac{1}{3} + 12\frac{1}{6}$

$$= \frac{25}{2} + \frac{37}{3} + \frac{73}{6}$$

$$= \frac{75 + 74 + 73}{6}$$

$$= \frac{222}{6} = 37$$

Ans: B

07. $\frac{2x}{1 + \frac{1}{1 + \frac{x}{1-x}}} = 1$

$$\Rightarrow \frac{2x}{1 + \frac{1-x}{1}} = 1$$

$$\Rightarrow \frac{2x}{2-x} = 1$$

$$\Rightarrow 2x = 2-x$$

$$\Rightarrow 3x = 2$$

$$\Rightarrow x = \frac{2}{3}$$

Ans: C

08

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

$$= \frac{20 + 24 - 15}{60} = \frac{29}{60}$$

Ans: —

(3)

09.

$$\frac{2}{3} \div \left(\frac{4}{5} - \frac{1}{2} \right)$$

$$= \frac{2}{3} \div \left(\frac{8-5}{10} \right)$$

$$= \frac{2}{3} \div \frac{3}{10}$$

$$= \frac{2}{3} \times \frac{10}{3} = \frac{20}{9}$$

Ans: —

10

$$3\frac{3}{5} = \frac{18}{5} = 3.6$$

$$2\frac{4}{7} = \frac{18}{7} = 2.5$$

$$\frac{19}{6} = 3.1$$

$$\frac{18}{8} = 2.2$$

$$\text{Greatest} = 3\frac{3}{5} = \frac{18}{5}$$

$$\text{Least} = \frac{18}{8} = \frac{9}{4}$$

$$\therefore \text{Difference} = \frac{18}{5} - \frac{9}{4}$$

$$= \frac{72 - 45}{20} = \frac{27}{20}$$

Ans: A

11.

$$\left(\frac{2}{5} + \frac{3}{5} \right) \div \left(\frac{1}{5} - \frac{4}{10} \right)$$

$$= \left(\frac{5}{5} \right) \div \left(\frac{14-4}{10} \right)$$

$$= 1 \div 1$$

$$= 1$$

Ans: A

12

$$3\frac{1}{4} + \frac{1}{2} \div \frac{3}{4} - \frac{1}{2} \times 3\frac{1}{2}$$

$$= \frac{13}{4} + \frac{1}{2} \div \frac{3}{4} - \frac{1}{2} \times \frac{7}{2}$$

$$= \frac{15}{4} \times \frac{4}{3} - \frac{7}{4}$$

$$= \frac{15}{3} - \frac{7}{4} =$$



12. $3\frac{1}{4} + \frac{1}{2} \div \frac{3}{4} - \frac{1}{2} \times 3\frac{1}{2}$

$$= \frac{13}{4} + \frac{1}{2} \div \frac{3}{4} - \frac{1}{2} \times \frac{7}{2}$$

$$= \frac{13}{4} + \frac{1}{2} \times \frac{4}{3} - \frac{7}{4}$$

$$= \frac{13}{4} + \frac{4}{6} - \frac{7}{4}$$

$$= \frac{39+8-21}{12}$$

$$= \frac{26}{12} = \frac{13}{6} = 2\frac{1}{6}$$

Ans: A

13. Side of square = $a = 6\frac{2}{3} = \frac{20}{3}$

$$\text{Area} = a^2 = \frac{20}{3} \times \frac{20}{3} = \frac{400}{9} = 45 \text{ m}^2 \text{ (approx)}$$

Ans: B

14. $x \times y = \frac{145}{7}$

$$\Rightarrow x \times \frac{20}{3} = \frac{145}{7}$$

$$\Rightarrow x = \frac{145}{7} \times \frac{3}{20}$$

$$\Rightarrow x = \frac{87}{28}$$

Ans: D

15. $\frac{a}{b} \times \frac{b}{c} = \frac{3}{4} \times \frac{5}{6}$

$$\Rightarrow \frac{a}{c} = \frac{5}{8}$$

Ans: A

16. Given fraction $\frac{2}{3}$
B) reciprocal $\frac{3}{2}$ (True)

C) Equivalent to $\frac{4}{6}$ (True)

Ans: B, C

17. Let us suppose that $\frac{1}{4} < \frac{1}{2}$ ($\frac{a}{b} < \frac{c}{d}$) (5)

$$\Rightarrow 2 < 4 \text{ (ad < bc) (True)}$$

$$\Rightarrow 1+4 < 1+2 \text{ (a+b < c+d) (False)}$$

$$\Rightarrow 1-4 < 1-2 \text{ (a-b < c-d) (True)}$$

Ans: A, D

18. Studying time = $2\frac{3}{5} + \frac{1}{4}$

$$= \frac{13}{5} + \frac{1}{4}$$

$$= \frac{57}{20} \text{ hr or } 2\frac{17}{20} \text{ hr}$$

Ans: A, D

19. $\frac{2}{3} = 0.6\bar{6}$

$$\frac{5}{6} = 0.8\bar{3}$$

A) $\frac{3}{4} = 0.7$ (True) | C) $\frac{5}{4} = 1.2$ (False)

B) $\frac{7}{10} = 0.7$ (True) | D) $\frac{10}{7} = 1.4$ (False)

Ans: A, B

20. Assertion: $\frac{1}{3}$ & $\frac{2}{5}$

$$= \frac{1}{3} \times \frac{5}{5} \text{ \& } \frac{2}{5} \times \frac{3}{3}$$

$$= \frac{5}{15} \text{ \& } \frac{6}{15}$$

Clearly $\frac{5}{15} < \frac{6}{15}$ (Assertion is False)

Reason: Conceptual (True)

Ans: D

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

Ans: A

22. Statement I: $\frac{8}{25} + \frac{9}{25} + \frac{10}{25}$
 $= \frac{8+9+10}{25} = \frac{27}{25}$ (True)

Ans: A

Statement II: Conceptual (True)

23. Statement I: $\frac{24}{25} \times \frac{5}{8} = \frac{3}{5}$ (False)

Statement II: Conceptual (True)

Ans: D

24. $12 \text{ Chocolates} = \frac{4}{6} \times 216 \text{ Kg}$
 $= 144 \text{ Kg}$

$1 \text{ Chocolate} = \frac{144}{12} \text{ Kg} = 12 \text{ Kg.}$

$15 \text{ Chocolates} = 12 \times 15 \text{ Kg}$
 $= 180 \text{ Kg}$

Ans: B

25. $\frac{3}{5} + \frac{2}{5} = \frac{3+2}{5} = \frac{5}{5} = 1$

Ans: 1

26. $\frac{9}{2} + \frac{\frac{3}{2} \div \frac{6}{4}}{\frac{5}{3} \div \frac{5}{6}} - 1$ | $= \frac{9}{2} + \frac{1}{2} - 1$
 $= \frac{9}{2} + \frac{\frac{3}{2} \times \frac{4}{6}}{\frac{5}{3} \times \frac{6}{5}} - 1$ | $= \frac{9+1}{2} - 1$
 $= 5 - 1$
 $= 4$

Ans: 4

$$27) a) 9\frac{3}{4} + 7\frac{7}{6} + 3\frac{5}{12}$$

$$= \frac{39}{4} + \frac{49}{6} + \frac{41}{12}$$

$$= \frac{117 + 98 + 41}{12}$$

$$= \frac{256}{12} = 21\frac{1}{3}$$

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

$$= \frac{13}{4} - \frac{11}{6} + \frac{19}{8}$$

$$= \frac{39 - 44 + 57}{24} = \frac{91}{24} = 3\frac{19}{24}$$

$$= \frac{\boxed{39}}{\boxed{24}} = \frac{\boxed{39}}{\boxed{24}} = 3\frac{19}{24}$$

$$c) 9\frac{5}{14} - 6\frac{8}{21} + \frac{25}{42}$$

$$= \frac{131}{14} - \frac{134}{21} + \frac{25}{42}$$

$$= \frac{393 - 268 + 25}{42}$$

$$= \frac{150}{42}$$

$$= 3\frac{4}{7}$$

$$d) 2\frac{1}{8} - \frac{7}{12} - \frac{23}{24}$$

$$= \frac{17}{8} - \frac{7}{12} - \frac{23}{24}$$

$$= \frac{51 - 14 - 23}{24}$$

$$= \frac{14}{24} = \frac{7}{12}$$

Ans: Q, P, R, S

LEARNER'S TASK

CUB'S

01. $\frac{2}{3} + \frac{1}{4}$

$$= \frac{8+3}{12} = \frac{11}{12}$$

Ans: B

02. $\frac{3}{5} - \frac{1}{5} = x$

$$\Rightarrow x = \frac{2}{5}$$

Ans: A

03. $\frac{2}{3} \times \frac{5}{4} = \frac{5}{6}$ ③
Ans: A

04. $\frac{15}{7} \times \frac{28}{45} = \frac{4}{3}$ Ans: B

05. $\frac{80}{9} \div \frac{16}{7} = \frac{x}{9}$
 $\Rightarrow \frac{80}{9} \times \frac{7}{16} = \frac{x}{9}$
 $\Rightarrow \frac{35}{9} = \frac{x}{9} \Rightarrow x = 35$ Ans: A

06. $\frac{9}{8} - x = \frac{39}{56}$
 $\Rightarrow x = \frac{9}{8} - \frac{39}{56}$
 $\Rightarrow x = \frac{63-39}{56}$
 $\Rightarrow x = \frac{24}{56} \Rightarrow x = \frac{3}{7}$ Ans: C

07. 1 hour $\rightarrow \frac{30}{4}$ km
 4 hours $\rightarrow 4 \times \frac{30}{4}$ km = 30 km Ans: C

08. $\frac{2}{3} + x = 1$
 $\Rightarrow x = 1 - \frac{2}{3}$
 $\Rightarrow x = \frac{1}{3}$ Ans: A

09. $\frac{x}{y} \times \frac{z}{y} \times \frac{y}{z} \times \frac{y}{z} = \frac{x}{z}$ Ans: C

10. Reciprocal of $\frac{3}{5}$ is $\frac{5}{3}$ Ans: C

11. $\frac{16}{5} \div \frac{2}{1}$

(9)

$\Rightarrow \frac{16}{5} \times \frac{1}{2} = \frac{16}{10} = 1\frac{3}{5}$

Ans: D

12. Remaining drink = $1 - \frac{3}{8} = \frac{5}{8}$ lit

In 24 days = $\frac{9}{8} \times \frac{3}{8} \times 24 = 9$ lit

Ans: B

13. $\frac{1}{2} + \frac{1}{x} = 2$

$\Rightarrow \frac{1}{x} = 2 - \frac{1}{2}$

$\Rightarrow \frac{1}{x} = \frac{3}{2}$

$\Rightarrow x = \frac{2}{3}$

Ans: A

14. $\frac{4}{7} \div \frac{2}{3} = y$

$\Rightarrow \frac{4}{7} \times \frac{3}{2} = y$

$\Rightarrow \frac{6}{7} = y$

Ans: A

JEE MAINS LEVEL

01. $\frac{a}{b} \times \frac{b}{c} = \frac{2}{3} \times \frac{3}{4} = \frac{1}{2}$

$\therefore \frac{a}{c} = \frac{1}{2}$

Ans: A

02. $\frac{p+q}{p-q} = \frac{\left(\frac{p}{q}\right)+1}{\left(\frac{p}{q}\right)-1} = \frac{\frac{1}{2}+1}{\frac{1}{2}-1} = \frac{\left(\frac{3}{2}\right)}{-\frac{1}{2}} = -3$

Ans: —

03. $\frac{2}{3} + \frac{1}{5} + x = 1$

$\Rightarrow \frac{13}{15} + x = 1$

$x = 1 - \frac{13}{15}$

$x = \frac{2}{15}$

Ans: C



04. $\frac{1}{7} + \frac{2}{7} + x = 1$

(10)

$$\Rightarrow \frac{3}{7} + x = 1$$

$$\Rightarrow x = 1 - \frac{3}{7}$$

$$\Rightarrow x = \frac{4}{7}$$

Ans: D

05. $\frac{1}{8} + \frac{3}{4}$

$$= \frac{1+6}{8} = \frac{7}{8}$$

Ans: A

06. A) $\frac{3}{4} + \frac{1}{5}$

$$= \frac{15+4}{20} = \frac{19}{20} \text{ (No)}$$

B) $\frac{1}{4} + \frac{3}{5}$

$$= \frac{5+12}{20} = \frac{17}{20} \text{ (No)}$$

C) $\frac{5}{8} + \frac{3}{4}$

$$= \frac{5+6}{8} = \frac{11}{8} = 1\frac{3}{8} \text{ (Yes)}$$

D) $\frac{1}{8} + \frac{3}{4}$

$$= \frac{1+6}{8} = \frac{7}{8} \text{ (No)}$$

Ans: C

07. $\frac{4}{10} + \frac{5}{100} + \frac{7}{1000}$

$$= \frac{400 + 50 + 7}{1000} = \frac{457}{1000}$$

Ans: C

08. $4\frac{1}{5} - \left[3\frac{1}{3} - \left\{ 2\frac{1}{2} - \left(\frac{1}{3} + \frac{1}{6} - \frac{1}{12} \right) \right\} \right]$

$$= \frac{21}{5} - \left[\frac{10}{3} - \frac{5}{2} + \left(\frac{4+2-1}{12} \right) \right]$$

$$= \frac{21}{5} - \frac{10}{3} + \frac{5}{2} - \frac{5}{12} = \frac{252 - 200 + 150 - 25}{60}$$

$$= \frac{177}{60} = \frac{59}{20}$$

Ans: A



09) $5\frac{1}{6} - 3\frac{4}{9} + x = \frac{7}{3} \times 4\frac{1}{6}$

(11)

$$= \frac{31}{6} - \frac{31}{9} + x = \frac{7}{3} \times \frac{25}{6}$$

$$= x = \frac{175}{18} - \frac{31}{6} + \frac{31}{9}$$

$$= \frac{175 - 93 + 62}{18} = \frac{144}{18} = 8$$

Ans: A

10. Manish unread = $1 - \frac{5}{6} = \frac{1}{6}$

Ans: B

11. $A = 41\frac{2}{3} \times 18\frac{3}{5}$

$$= \frac{125}{3} \times \frac{93}{5}$$

$$= 775 \text{ m}^2$$

Ans: D

12. Cost per 1 kg = $\frac{101\frac{1}{4}}{5\frac{2}{5}} = \frac{405}{4} \times \frac{5}{27}$

$$= \frac{75}{4} = 18\frac{3}{4}$$

Ans: A

13 B) $\frac{7}{10} \times \frac{2}{2} = \frac{14}{20}$ (True)

c) $\frac{7}{10} = 0.7$ (True)

d) $\frac{7}{10} = 0.7, \frac{3}{5} = 0.6$
 $0.7 > 0.6$ (True)

Ans: B, C, D



14.

$$\frac{p}{q} = \frac{2}{3}$$

(12)

$$\Rightarrow p = 2x, q = 3x$$

$$\begin{aligned} 3p + 2q &= 3(2x) + 2(3x) \\ &= 6x + 6x \\ &= 12x \end{aligned}$$

$$15. A) \frac{6}{5} \times \frac{1}{4} = \frac{3}{10} \text{ (True)}$$

$$B) \frac{6}{5} + \frac{1}{4} = \frac{24+5}{20} = \frac{29}{20} \text{ (False)}$$

$$C) \frac{6}{5} \div \frac{1}{4} = \frac{6}{5} \times \frac{4}{1} = \frac{24}{5} \text{ (False)}$$

$$D) \frac{6}{5} - \frac{1}{4} = \frac{24-5}{20} = \frac{19}{20} \text{ (True)}$$

Ans: A, D

$$16. \text{Assertion: } \frac{3}{5} \times \frac{2}{2} = \frac{6}{10} \text{ (True)}$$

Reason: False

Ans: C

17. Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans: A

$$18. \text{Statement I: } \frac{18}{15} - \frac{9}{7}$$

$$= \frac{126 - 135}{105} = \frac{-9}{105}, \text{ it is not whole No. (False)}$$

Statement II: Conceptual (True)

Ans: D

$$19. \frac{3}{4} = 0.75$$

$$\frac{5}{11} = 0.45$$

$$A) \frac{1}{2} = 0.5 \text{ (True)} \quad C) 3 \text{ (False)}$$

$$B) \frac{8}{17} = 0.47 \text{ (False)} \quad D) \frac{13}{22} = 0.5 \text{ (False)}$$

Ans: A

$$20. 24 \times \frac{1}{4} = 6 \text{ people}$$

Ans: 6

$$21. \frac{t}{2} \div \frac{5}{6} = \frac{9}{5}$$

$$\Rightarrow \frac{t}{2} \times \frac{6}{5} = \frac{9}{5}$$

$$\Rightarrow t = 3$$

Ans: 3

$$22. a) 7\frac{1}{4} \times 3\frac{5}{6} = \frac{29}{4} \times \frac{23}{6} = \frac{667}{24}$$

$$b) \left(3\frac{3}{5}\right) \div \frac{9}{8} = \frac{18}{5} \times \frac{8}{9} = \frac{16}{5}$$

$$c) \frac{135}{60} \times \frac{190}{11} = \frac{855}{22}$$

$$d) \frac{1}{5} \div \frac{1}{2} = \frac{1}{5} \times \frac{2}{1} = \frac{2}{5}$$

Ans: S, x, y, P

$\Rightarrow$ THE END $\Leftarrow$