

FRACTIONS

1. Compare the given fractions:





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LCM of 28 and 42 = 84

$$\frac{13}{28} = \frac{13 \times 3}{28 \times 3}$$

 $LCM = 2 \times 7 \times 2 \times 3 = 84$

(Multiply numerator and denominator by 3)

Now,
$$\frac{19}{42} = \frac{19 \times 2}{42 \times 2}$$

(Multiply numerator and denominator by 2)

	_	38	
	_	84	
Clearly	39	38	
Clearly,	84	84	
	13	19	
l.e.,	$\overline{28}$	$> \frac{1}{42}$	

2. Compare the given fractions (by making numerators equal):

(i)
$$\frac{6}{7}$$
 and $\frac{16}{19}$ (ii) $\frac{8}{11}$ and $\frac{18}{19}$ (iii) $\frac{15}{16}$ and $\frac{25}{27}$
Ans. (i) $\frac{6}{7}$ and $\frac{16}{19}$
LCM of 6 and 16 = 48
 $\therefore \qquad \frac{6}{7} = \frac{6 \times 8}{7 \times 8} = \frac{48}{56}$
 $\frac{16}{19} = \frac{16 \times 3}{19 \times 3} = \frac{48}{57}$

Now, numerator of these two fractions is the same, therefore, the fraction having the smaller denominator will be the greater

$$\therefore \qquad \frac{48}{56} > \frac{48}{57} \qquad i.e., \qquad \frac{6}{7} > \frac{16}{19}$$

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3. (A) Write down the given fractions in ascending order of magnitude (by making denominators equal) :

<i>(i)</i>	$\frac{16}{25}$, $\frac{24}{35}$ and $\frac{37}{50}$ (<i>ii</i>) $\frac{7}{8}$, $\frac{1}{10}$	$\frac{11}{12}, \frac{1}{1}$	$\frac{3}{6}$,	$\frac{17}{24}$		
(iii)	$\frac{10}{21}, \frac{13}{28}, \frac{26}{35}, \frac{29}{42}$		5	25.	35.	50
Ans.(i)	$\frac{10}{25}$, $\frac{24}{35}$ and $\frac{57}{50}$		5	5,	7,	$\frac{10}{2}$
	LCM 01 25, 55 and $50 = 550$			1,	7,	Z

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$$\therefore \frac{16}{25} = \frac{16 \times 14}{25 \times 14} = \frac{224}{350} \qquad \text{LCM} = 5 \times 5 \times 7 \times 2 = 350$$

$$\frac{24}{35} = \frac{24 \times 10}{35 \times 10} = \frac{240}{350}$$

$$\frac{37}{50} = \frac{37 \times 7}{50 \times 7} = \frac{259}{350}$$

$$\therefore \text{ Clearly, fractions in ascending order are :}$$

$$\frac{224}{350}, \frac{240}{350}, \frac{259}{350} \qquad i.e., \qquad \frac{16}{25}, \frac{24}{35}, \frac{37}{50}.$$
(ii) $\frac{7}{8}, \frac{11}{12}, \frac{13}{16}, \frac{17}{24}$

$$\text{LCM of 8, 12, 16, 24 = 48}$$

$$\frac{2}{2} = \frac{8}{4}, \frac{12}{6}, \frac{16}{8}, \frac{12}{2}$$

$$\frac{2}{2}, \frac{3}{3}, \frac{4}{6}, \frac{6}{8}, \frac{12}{2}$$

$$\frac{7}{8} = \frac{7 \times 6}{8 \times 6} = \frac{42}{48}$$

$$\frac{11}{12} = \frac{11 \times 4}{12 \times 4} = \frac{44}{48}$$

$$\frac{13}{16} = \frac{13 \times 3}{16 \times 3} = \frac{39}{48}$$

$$\frac{17}{24} = \frac{17 \times 2}{24 \times 2} = \frac{34}{48}$$

It is clear from above that





$$\frac{34}{48} < \frac{39}{48} < \frac{42}{48} < \frac{44}{48} \quad \text{or} \quad \frac{17}{24} < \frac{13}{16} < \frac{7}{8} < \frac{11}{12}$$
(iii) $\frac{10}{21}, \frac{13}{28}, \frac{26}{35}, \frac{29}{42}$
LCM of 21, 28, 35 and 42 = 420
i.e., $\frac{10}{21} \times \frac{20}{20} = \frac{200}{420}, \quad \frac{13}{28} \times \frac{15}{15} = \frac{195}{420}$
 $\frac{26}{35} \times \frac{12}{12} = \frac{312}{420} \quad \text{and} \quad \frac{29}{42} \times \frac{10}{10} = \frac{290}{420}$

$$\Rightarrow \quad \frac{195}{420} < \frac{200}{420} < \frac{290}{420} < \frac{312}{420}$$

$$\Rightarrow \quad \frac{13}{18} < \frac{10}{21} < \frac{29}{42} < \frac{26}{35}$$

3. (**B**)Arrange the following fractions in descending order of magnitudes by making denominators equal :

	(\mathbf{i})	7	13	17	21	31		(;;)	5	9	16	23	29
	(l)	10'	15'	20	25	50		(u)	7'	14'	25'	28'	42
Ans.	LC	'M of	10,	15,	20, 2	25, 50	= 300						
			~		•	25							

$$\frac{2}{5} = 10, \quad 15, \quad 20, \quad 25, \quad 50$$

$$\frac{5}{5} = 5, \quad 15, \quad 10, \quad 25, \quad 25$$

$$\frac{5}{5} = 1, \quad 3, \quad 2, \quad 5, \quad 5$$

$$1, \quad 3, \quad 2, \quad 1, \quad 1$$

$$\text{LCM} = 2 \times 5 \times 5 \times 2 \times 3 = 300$$

$$\therefore \qquad \frac{7}{10} = \frac{7 \times 30}{10 \times 30} = \frac{210}{300}$$

$$\frac{13}{15} = \frac{13 \times 20}{15 \times 20} = \frac{260}{300}$$

$$\frac{17}{20} = \frac{17 \times 15}{20 \times 15} = \frac{255}{300}$$

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$$\frac{21}{25} = \frac{21 \times 12}{25 \times 12} = \frac{252}{300}$$
$$\frac{31}{50} = \frac{31 \times 6}{50 \times 6} = \frac{186}{300}$$

It is clear from above that

 $\frac{260}{300} > \frac{255}{300} > \frac{252}{300} > \frac{210}{300} > \frac{186}{300} \text{ or } \frac{13}{15} > \frac{17}{20} > \frac{21}{25} > \frac{7}{10} > \frac{31}{50}$ (*ii*) $\frac{5}{7}, \frac{9}{14}, \frac{16}{21}, \frac{23}{28}, \frac{29}{42}$

Ans. LCM of 7, 14, 21, 28 and 42 = 84

i.e., $\frac{5}{7} \times \frac{12}{12} = \frac{60}{84}$, $\frac{9}{14} \times \frac{6}{6} = \frac{54}{84}$ $\frac{16}{21} \times \frac{4}{4} = \frac{64}{84}$, $\frac{23}{28} \times \frac{3}{3} = \frac{69}{84}$ and $\frac{29}{42} \times \frac{2}{2} = \frac{58}{84}$ $\Rightarrow \frac{69}{84} > \frac{64}{84} > \frac{60}{84} > \frac{58}{84} > \frac{54}{84} \Rightarrow \frac{23}{28} > \frac{16}{21} > \frac{5}{7} > \frac{29}{42} > \frac{9}{14}$

4. Arrange the following fractions in ascending order of magnitudes by making numerators equal :

(i)
$$\frac{5}{6}, \frac{10}{13}, \frac{15}{17}, \frac{20}{21}, \frac{30}{37}$$

Ans. LCM of 5, 10, 15, 20, 30 = 60
 $\frac{2}{3} \frac{5}{5}, \frac{5}{5}, \frac{15}{15}, \frac{10}{10}, \frac{15}{5}$
 $\frac{5}{5} \frac{5}{5}, \frac{5}{5}, \frac{5}{5}, \frac{10}{10}, \frac{5}{5}$
 $1, 1, 1, 2, 1$
 \therefore LCM = 2 × 3 × 5 × 2 = 60
 \therefore $\frac{5}{6} = \frac{5 \times 12}{6 \times 12} = \frac{60}{72}$
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$$\frac{10}{13} = \frac{10 \times 6}{13 \times 6} = \frac{60}{78}$$

$$\frac{15}{17} = \frac{15 \times 4}{17 \times 4} = \frac{60}{68}$$

$$\frac{20}{21} = \frac{20 \times 3}{21 \times 3} = \frac{60}{63}$$

$$\frac{30}{37} = \frac{30 \times 2}{37 \times 2} = \frac{60}{74}$$
It is clear from above that
$$\frac{60}{78} < \frac{60}{74} < \frac{60}{72} < \frac{60}{68} < \frac{60}{63} \text{ or } \frac{10}{13} < \frac{30}{37} < \frac{5}{6} < \frac{15}{17} < \frac{20}{21}$$
(ii) $\frac{8}{11}, \frac{12}{17}, \frac{16}{23}, \frac{20}{27}, \frac{24}{35}$
Ans. LCM of 8, 12, 16, 20, 24 = 240
$$\frac{2}{2} \frac{18}{4}, \frac{12}{6}, \frac{16}{8}, \frac{8}{10}, \frac{12}{2}$$

$$\frac{2}{2}, \frac{3}{2}, \frac{4}{5}, \frac{5}{3}$$

$$\frac{1}{1, 1, 2, 5, 1}$$

$$\therefore LCM = 2 \times 2 \times 2 \times 3 \times 2 \times 5 = 240$$

$$\frac{8}{11} = \frac{8 \times 30}{11 \times 30} = \frac{240}{330}$$

$$\frac{12}{17} = \frac{12 \times 20}{17 \times 20} = \frac{240}{340}$$

$$\frac{16}{23} = \frac{16 \times 15}{23 \times 15} = \frac{240}{345}$$

$$\frac{20}{27} = \frac{20 \times 12}{27 \times 12} = \frac{240}{324}$$

$$\frac{24}{35} = \frac{24 \times 10}{35 \times 10} = \frac{240}{350}$$
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$$\frac{7}{7}$$
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It is clear from above that

240 350 5. Wri mal (<i>i</i>)	$\frac{0}{0} < \frac{1}{2}$ te t cing $\frac{9}{13}$	$\frac{240}{345}$ he for g nur $\frac{18}{25}$	$\frac{2}{5} < \frac{2}{3}$ bllow merat $\frac{2}{5}, \frac{27}{40}$	$\frac{40}{40} < \frac{1}{100}$ ing fractions equations equation $\frac{7}{100}, \frac{36}{47}$	240 330 action ual :	$< \frac{24}{32}$ is in d	$\frac{0}{4}$ or esceler $\frac{10}{17}$,	$\frac{24}{35}$ nding $\frac{20}{37}$	$< \frac{16}{23}$ g ord $\frac{30}{47},$	$<\frac{12}{17}$ er of $\frac{40}{53}$,	$\frac{2}{7} < \frac{8}{11}$ magni $\frac{50}{61}$	$<\frac{20}{27}$ tudes by
Ans.(i)	$\frac{9}{13}$	$\frac{18}{25}$	$\frac{8}{5}, \frac{27}{40}$	$\frac{7}{0}, \frac{36}{47}$								
	2	9,	18,	27,	36							
	3	9,	9,	27,	18							
	3	3,	3,	9,	6							
		1,	1,	3,	2							
	LC	CM =	= 2 ×	3 × 3	× 3 ×	< 2 =	108					
				. 9	9	×12		08				
				13	$=\frac{1}{12}$	3×12	1	56				
				18	1	8×6	10)8				
				25	= 2	5×6	= 15	50				
				27	$-\frac{2}{2}$	7×4	_ 10)8				
				40	_4	0×4	_16	60				
				36	$=\frac{3}{2}$	6×3	$=\frac{10}{1000}$)8				
	т. •	1	C	47	4	7×3	14	1				
	It 1	IS CIE	ar fr	0m ab	ove t	hat		2	6	10	0	27
	$\frac{10}{14}$	$\frac{1}{1} > 1$	$\frac{100}{150}$	$<\frac{100}{150}$	$r > \frac{1}{1}$	$\frac{100}{100}$	\rightarrow	$\frac{J}{4}$	$\frac{1}{7} > 1$	$\frac{10}{25}$	$>\frac{9}{12}>$	$> \frac{27}{40}$
	14	·1) 2(150) 3(130	50	50		4	- /	25	13	40
(<i>ii</i>)	$\frac{10}{17}$	$\frac{2}{3}$, $\frac{2}{3}$	$\frac{5}{7}, \frac{5}{4}$	$\frac{1}{7}, \frac{10}{53}$	$, \frac{50}{61}$							
	2	10,	20.	30,	40,	50						
	$\overline{2}$	5,	10,	15,	20,	25						
	5	5,	5,	15,	10,	25						
		1,	1,	3,	2	5					6	
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 $\therefore LCM = 2 \times 2 \times 5 \times 3 \times 2 \times 5 = 600$

$$\frac{10}{17} = \frac{10 \times 60}{17 \times 60} = \frac{600}{1020}$$

$$\frac{20}{37} = \frac{20 \times 30}{37 \times 30} = \frac{600}{1110}$$

$$\frac{30}{37} = \frac{30 \times 20}{37 \times 20} = \frac{600}{940}$$

$$\frac{40}{53} = \frac{40 \times 15}{53 \times 15} = \frac{600}{795}$$

$$\frac{50}{61} = \frac{50 \times 12}{61 \times 12} = \frac{600}{732}$$

$$\frac{600}{732} > \frac{600}{795} > \frac{600}{940} > \frac{600}{1020} > \frac{600}{1110}$$
or $\frac{50}{61} > \frac{40}{53} > \frac{30}{47} > \frac{10}{17} > \frac{20}{37}$.
6. Insert three fractions between $\frac{8}{11}$ and $\frac{11}{16}$.
Ans. A fraction between $\frac{8}{11}$ and $\frac{11}{16} = \frac{8 + 11}{11 + 16} = \frac{19}{27}$

$$\therefore \frac{8}{11} < \frac{19}{27} < \frac{11}{16}$$
A fraction between $\frac{19}{27}$ and $\frac{11}{16} = \frac{19 + 11}{27 + 16} = \frac{30}{43}$

$$\frac{8}{11} < \frac{27}{38} < \frac{19}{27} < \frac{30}{43} < \frac{11}{16}$$
Hence, three fractions between $\frac{8}{11}$ and $\frac{11}{16}$ are $\frac{27}{38}$, $\frac{19}{27}$, $\frac{30}{43}$.
7. Find the greatest and the least fractions out of :
(i) $\frac{19}{36}$, $\frac{64}{81}$ and $\frac{41}{54}$
(ii) $\frac{8}{21}$, $\frac{9}{28}$, $\frac{5}{12}$ and $\frac{19}{84}$
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 $(vi) \frac{\frac{1}{6} + \frac{5}{12} \text{ of } \frac{3}{5}}{1\frac{2}{2} \times \frac{3}{4} - 1\frac{4}{5} \div \frac{5}{5}}$ (v) $\left(5 \div 2\frac{1}{4}\right) \div \left(9 \div 2\frac{1}{4}\right)$ $(vii)\frac{\frac{2}{3}+1\frac{7}{8}+4\div1\frac{1}{3}}{10\frac{1}{6}-\frac{7}{9} \text{ of } 11\frac{1}{7}}$ **Ans.** (i) $2\frac{1}{5} + 1\frac{4}{7} - 4\frac{1}{2} + 2\frac{8}{35} = \frac{11}{5} + \frac{11}{7} - \frac{9}{2} + \frac{78}{35}$ $=\frac{154+110-315+156}{70}$ $= \frac{420 - 315}{70} = \frac{105}{70} = \frac{35 \times 3}{35 \times 2}$ $= \frac{3}{2} = 1\frac{1}{2}.$ (*ii*) $1 - 2\frac{2}{5} \div 4\frac{1}{2}$ of $2\frac{2}{3} \times \frac{5}{6} + \frac{1}{2}$ $1 - \frac{12}{5} \div \frac{9}{2}$ of $\frac{8}{3} \times \frac{5}{6} + \frac{1}{3} = 1 - \frac{12}{5} \div 12 \times \frac{5}{6} + \frac{1}{3}$ 4 $= 1 - \frac{12}{5} \times \frac{1}{12} \times \frac{5}{6} + \frac{1}{2}$ $=1-\frac{1}{6}+\frac{1}{2}=\frac{6-1+2}{6}=\frac{7}{6}=1\frac{1}{6}$ $(iii) \frac{\frac{1}{5} \div \frac{1}{5} \text{ of } \frac{1}{5}}{\frac{1}{5} \text{ of } \frac{1}{5} \div \frac{1}{5}}$ $\frac{\frac{1}{5} \div \frac{1}{25}}{\frac{1}{25} \div \frac{1}{5}} = \frac{\frac{1}{5} \times \frac{25}{1}}{\frac{1}{25} \times \frac{5}{1}} = \frac{\frac{5}{1}}{\frac{1}{5}} = 5 \times 5 = 25.$

 $(iv)\left(6-3\frac{3}{4}\right)\left(7-4\frac{3}{4}\right) = \left(6-\frac{15}{4}\right)\left(7-\frac{19}{4}\right)$





$$= \left(\frac{24-15}{4}\right) \left(\frac{28-19}{4}\right)$$
$$= \left(\frac{9}{4}\right) \left(\frac{9}{4}\right) = \frac{81}{16} = 5\frac{1}{16}.$$
$$(v) \left(5 \div 2\frac{1}{4}\right) \div \left(9 \div 2\frac{1}{4}\right) = \left(5 \div \frac{9}{4}\right) \div \left(9 \div \frac{9}{4}\right)$$
$$= \left(5 \times \frac{4}{9}\right) \div \left(9 \times \frac{4}{9}\right)$$
$$= \left(\frac{5 \times \frac{4}{9}}{9}\right) \div \left(9 \times \frac{4}{9}\right)$$
$$= \frac{20}{9} \div \frac{4}{1} = \frac{20}{9} \times \frac{1}{4} = \frac{5}{9}.$$
$$(vi) \frac{\frac{1}{6} + \frac{5}{12} \text{ of } \frac{3}{5}}{1\frac{2}{3} \times \frac{3}{4} - 1\frac{4}{7} \div \frac{5}{3}} = \frac{\frac{1}{6} + \frac{1}{4}}{\frac{5}{3} \times \frac{3}{4} - \frac{11}{7} \div \frac{5}{3}} = \frac{\frac{2+3}{12}}{\frac{5}{4} - \frac{11}{7} \times \frac{3}{5}}$$
$$= \frac{\frac{5}{12}}{\frac{5}{12} \times \frac{140}{43}} = \frac{5}{3} \times \frac{35}{43} = \frac{175}{129} = 1\frac{46}{129}$$
$$(vii) \frac{\frac{2}{3} + 1\frac{7}{8} + 4 \div 1\frac{1}{3}}{10\frac{1}{6} - \frac{7}{8} \text{ of } 11\frac{1}{7}} = \frac{\frac{2}{3} + \frac{15}{8} + 4 \div \frac{4}{3}}{\frac{61}{6} - \frac{7}{8} \text{ of } \frac{78}{7}} = \frac{\frac{3}{24} + \frac{15}{8} + 4 \times \frac{3}{4}}{\frac{61}{6} - \frac{39}{4}}$$
$$= \frac{\frac{2}{3} + \frac{15}{8} + 3}{\frac{122 - 117}{12}} = \frac{\frac{16 + 45 + 72}{24}}{\frac{5}{12}}$$
$$= \frac{133}{24} \times \frac{12}{5} = \frac{133}{10} = 13\frac{3}{10}.$$

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9. Simplify the following expressions:

$$\begin{array}{ll} (i) & \frac{1}{5} \left[5 - \frac{1}{5} \left\{ 5 - \frac{1}{5} \left(5 - \frac{1}{5} \right) \right\} \right] \div 1\frac{1}{5} \\ (ii) & 7\frac{1}{2} - \left[2\frac{1}{4} \div \left[1\frac{1}{4} - \frac{1}{2} \left(1\frac{1}{2} - \frac{1}{3} - \frac{1}{6} \right) \right] \right] \\ (iii) & 3\frac{3}{4} \div \left\{ \frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{1}{3} - \frac{1}{4} - \frac{1}{6} \right) \right\} \\ (iv) & 37\frac{1}{2} - \left[3\frac{3}{4} \div \left\{ \frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{1}{3} - \frac{1}{4} - \frac{1}{6} \right) \right\} \right] \\ (v) & 2\frac{4}{5} - \frac{1}{3} \left[\frac{2}{7} + \frac{3}{4} \div \left(\frac{4}{15} - \frac{3}{7} - \frac{2}{21} \right) \right] \\ (vi) & \frac{3}{4} \div 2\frac{1}{4} \text{ of } \frac{2}{3} - \frac{\frac{1}{2} - \frac{1}{3}}{\frac{1}{2} + \frac{1}{3}} \times 3\frac{1}{3} + \frac{5}{6} \\ (vii) & \frac{3\frac{1}{4} - \frac{4}{5} \text{ of } \frac{5}{6} \\ \frac{4\frac{1}{3} \div \frac{1}{5} - \left(\frac{3}{10} + 21\frac{1}{5} \right) \\ (viii) & \frac{3\frac{1}{4} - \frac{4}{5} \text{ of } \frac{5}{6} \\ \frac{1}{5} \left[5 - \frac{1}{5} \left\{ 5 - \frac{1}{5} \left\{ 5 - \frac{1}{5} \right\} \right] \div 1\frac{1}{5} = \frac{1}{5} \left[5 - \frac{1}{5} \left\{ 5 - \frac{1}{5} \times \frac{24}{5} \right\} \right] \div \frac{6}{5} \\ = \frac{1}{5} \left[5 - \frac{1}{5} \left\{ 5 - \frac{1}{5} \left\{ 5 - \frac{24}{25} \right\} \right] \div \frac{6}{5} \\ = \frac{1}{5} \left[5 - \frac{101}{125} \right] \div \frac{6}{5} \\ = \frac{1}{5} \left[5 - \frac{101}{125} \right] \div \frac{6}{5} \\ = \frac{1}{5} \left[5 - \frac{101}{125} \right] \div \frac{6}{5} \\ = \frac{1}{5} \left[5 - \frac{101}{125} \right] \div \frac{6}{5} \\ = \frac{1}{5} \left[5 - \frac{101}{125} \right] \div \frac{6}{5} \\ = \frac{1}{5} \left[5 - \frac{101}{125} \right] \div \frac{6}{5} \\ = \frac{1}{5} \left[5 - \frac{101}{125} \right] \div \frac{6}{5} \\ = \frac{1}{5} \left[5 - \frac{101}{125} \right] \div \frac{6}{5} \\ = \frac{1}{5} \times \frac{524}{125} \times \frac{5}{6} = \frac{262}{375}. \\ \end{array} \right]$$





$$\begin{array}{l} \text{(ii)} & 7\frac{1}{2} - \left[2\frac{1}{4} \div \left\{ 1\frac{1}{4} - \frac{1}{2} \left(1\frac{1}{2} - \frac{1}{3} - \frac{1}{6} \right) \right\} \right] \\ &= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \left(\frac{3}{2} - \frac{1}{3} - \frac{1}{6} \right) \right\} \right] \\ &= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \left(\frac{9 - 2 - 1}{6} \right) \right\} \right] \\ &= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \times \frac{6}{6} \right\} \right] = \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \right\} \right] \\ &= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5 - 2}{4} \right\} \right] = \frac{15}{2} - \left[\frac{9}{4} \div \frac{3}{4} \right] = \frac{15}{2} - \left[\frac{9}{4} \times \frac{4}{3} \right] \\ &= \frac{15}{2} - 3 = \frac{15 - 6}{2} = \frac{9}{2} = 4\frac{1}{2} \\ \text{(iii)} & 3\frac{3}{4} \div \left\{ \frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{1}{3} - \frac{1}{4} - \frac{1}{6} \right) \right\} \\ &= \frac{15}{4} \div \left\{ \frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{1}{3} - \frac{1}{4} + \frac{1}{6} \right) \right\} = \frac{15}{4} \div \left\{ \frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{1}{3} - \frac{3 - 2}{12} \right) \right\} \\ &= \frac{15}{4} \div \left\{ \frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{1}{3} - \frac{1}{4} - \frac{1}{6} \right) \right\} \\ &= \frac{15}{4} \div \left\{ \frac{5}{6} \times \frac{2}{3} \times \frac{1}{4} \right\} = \frac{15}{2} \div \frac{5}{36} = \frac{15}{4} \times \frac{36}{5} = 3 \times 9 = 27 \\ \text{(iv)} & 37\frac{1}{2} - \left[3\frac{3}{4} \div \left\{ \frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{1}{3} - \frac{1}{4} - \frac{1}{6} \right) \right\} \right] \\ &= \frac{75}{2} - \left[\frac{15}{4} \div \left\{ \frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{1}{3} - \frac{1}{4} + \frac{1}{6} \right) \right\} \right] \\ &= \frac{75}{2} - \left[\frac{15}{4} \div \left\{ \frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{1}{3} - \frac{1}{4} - \frac{1}{6} \right) \right\} \right] \end{array}$$

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$$\begin{aligned} &= \frac{75}{2} - \left[\frac{15}{4} \div \left\{\frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{1}{3} - \frac{1}{12}\right)\right\}\right] \\ &= \frac{75}{2} - \left[\frac{15}{4} \div \left\{\frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{4 - 1}{12}\right)\right\}\right] \\ &= \frac{75}{2} - \left[\frac{15}{4} \div \left\{\frac{5}{6} \text{ of } \frac{2}{3} \left(\frac{4 - 1}{12}\right)\right\}\right] \\ &= \frac{75}{2} - \left[\frac{15}{4} \div \left\{\frac{5}{6} \times \frac{2}{3} \times \frac{1}{4}\right\}\right] = \frac{75}{2} - \left[\frac{15}{4} \div \frac{5}{36}\right] \\ &= \frac{75}{2} - \left[\frac{15}{4} \div \left\{\frac{5}{6} \times \frac{2}{3} \times \frac{1}{4}\right\}\right] = \frac{75}{2} - \left[\frac{15}{4} \div \frac{5}{36}\right] \\ &= \frac{75}{2} - \left[\frac{15}{4} \div \left(\frac{4}{15} - \frac{3}{7} - \frac{2}{21}\right)\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{2}{7} + \frac{3}{4} \div \left(\frac{4}{15} - \frac{7}{21}\right)\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{2}{7} + \frac{3}{4} \div \left(\frac{4}{15} - \frac{7}{21}\right)\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{2}{7} + \frac{3}{4} \div \left(\frac{4}{15} - \frac{7}{21}\right)\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{2}{7} + \frac{3}{4} \div \left(\frac{4 - 5}{15}\right)\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{2}{7} + \frac{3}{4} \div \left(\frac{4 - 5}{15}\right)\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{2}{7} - \frac{3}{4} \times \frac{15}{1}\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{2}{7} - \frac{3}{4} \times \frac{15}{1}\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{2}{7} - \frac{3}{4} \times \frac{15}{1}\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{8 - 315}{28}\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{8 - 315}{28}\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{8 - 315}{28}\right] \\ &= \frac{14}{5} - \frac{1}{3}\left[\frac{3 - 1}{2} - \frac{1}{3} \times 3\frac{1}{3} + \frac{5}{6}\right] \\ (vi) \frac{3}{4} \div 2\frac{1}{4} \text{ of } \frac{2}{3} - \frac{\frac{1}{2} - \frac{1}{3}}{\frac{1}{3} \times 3\frac{1}{3} + \frac{5}{6} \\ \\ \text{Math Class VIII \end{aligned}$$





$$= \frac{3}{4} \div \frac{3}{2} - \frac{2}{3} \div \frac{5}{6} = \frac{3}{4} \times \frac{2}{3} - \frac{2}{3} \div \frac{5}{6} = \frac{1}{2} - \frac{2}{3} \div \frac{5}{6}$$
$$= \frac{3 - 4 + 5}{6} = \frac{4}{6} = \frac{2}{3}$$
$$vii) \quad \frac{3\frac{1}{4} - \frac{4}{5} \text{ of } \frac{5}{6}}{4\frac{1}{3} \div \frac{1}{5} - \left(\frac{3}{10} + 21\frac{1}{5}\right)}$$

(vii)
$$\frac{436}{4\frac{1}{3} \div \frac{1}{5} - \left(\frac{3}{10} + 21\frac{1}{5}\right)}$$

$$=\frac{\frac{13}{4}-\frac{4}{5} \text{ of } \frac{5}{6}}{\frac{13}{3}\div\frac{1}{5}-\left(\frac{3}{10}+\frac{106}{5}\right)} =\frac{\frac{13}{4}-\frac{2}{3}}{\frac{13}{3}\times\frac{5}{1}-\left(\frac{3+212}{10}\right)}$$
$$=\frac{\frac{13}{4}-\frac{2}{3}}{\frac{65}{2}-\frac{215}{10}} =\frac{\frac{39-8}{12}}{\frac{650-645}{20}} =\frac{\frac{31}{12}}{\frac{5}{20}}$$

$$= \frac{31}{12} \times \frac{30}{5} = \frac{31}{2} = 15\frac{1}{2}$$

(viii) $\frac{\frac{3}{7} - \frac{2}{9}}{\frac{3}{7} + \frac{2}{9}}$ of $2\frac{11}{26} \div \frac{4}{13 - 3\frac{8}{9}}$

$$=\frac{\frac{3}{7}-\frac{2}{9}}{\frac{3}{7}+\frac{2}{9}} \text{ of } \frac{63}{26} \div \frac{4}{13-\frac{35}{9}} = \frac{\frac{27-14}{63}}{\frac{27+14}{63}} \text{ of } \frac{63}{26} \div \frac{4}{13-\frac{35}{9}}$$
13

$$= \frac{\overline{63}}{41} \text{ of } \frac{63}{26} \div \frac{4}{117 - 35} = \left(\frac{13}{63} \times \frac{63}{41}\right) \text{ of } \frac{63}{26} \div \frac{4}{\frac{82}{9}}$$
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$$= \frac{13}{41} \text{ of } \frac{63}{26} \div \left[\frac{4}{1} \times \frac{9}{82}\right] = \frac{13}{41} \text{ of } \frac{63}{26} \div \left(\frac{4 \times 9}{82}\right)$$
$$= \frac{13}{41} \times \frac{63}{26} \div \frac{18}{41} = \frac{63}{82} \div \frac{18}{41} = \frac{63}{82} \times \frac{41}{18}$$
$$= \frac{63}{82} \times \frac{41}{18} = \frac{7}{4} = 1\frac{3}{4}$$

10. Simplify:

Simplify:
(i)
$$1 - \frac{1}{1 - \frac{1}{1 - \frac{1}{3}}}$$
 (ii) $\frac{2}{3 + \frac{1}{4 + \frac{1}{1 + \frac{1}{5}}}}$ (iii) $3 + \frac{3}{2 - \frac{2}{3 + \frac{3}{2 - \frac{4}{7}}}}$

Ans. (i)
$$1 - \frac{1}{1 - \frac{1}{3}} = 1 - \frac{1}{1 - \frac{1}{2}} = 1 - \frac{1}{1 - \frac{3}{2}}$$

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

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

(*ii*)
$$\frac{2}{3+\frac{1}{4+\frac{1}{1+\frac{1}{5}}}} = \frac{2}{3+\frac{1}{4+\frac{1}{\frac{6}{5}}}} = \frac{2}{3+\frac{1}{4+\frac{5}{6}}}$$
$$= \frac{2}{3+\frac{1}{\frac{29}{6}}} = \frac{2}{3+\frac{6}{29}} = \frac{2}{\frac{87+6}{29}}$$
$$= \frac{2\times 29}{93} = \frac{58}{93}$$

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11. $\frac{4}{15}$ of $\frac{5}{7}$ of a number is greater than $\frac{4}{9}$ of $\frac{2}{5}$ of the same number by 8. Find the number.

Ans.Let number be *x*.

Then, $\frac{4}{15}$ of $\frac{5}{7}$ of $x = \frac{4}{9}$ of $\frac{2}{5}$ of x + 8 $\Rightarrow \qquad \frac{4}{21}x = \frac{8}{45}x + 8$ $\Rightarrow \qquad \frac{4}{21}x - \frac{8}{45}x = 8 \qquad \Rightarrow \qquad \frac{180x - 168x}{21 \times 45} = 8$ $\Rightarrow \qquad \frac{12x}{21 \times 45} = 8 \qquad \Rightarrow \qquad 12x = 8 \times 21 \times 45$ $\Rightarrow \qquad x = \frac{8 \times 21 \times 45}{12} = 630$

Hence, required number is 630.

12. Find the fraction which is as much greater than $\frac{5}{8}$ as is less than $\frac{3}{4}$. Ans.Let the fraction be 'x'. Then

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Hence, the required fraction is $\frac{11}{16}$.

- **13.** One-seventh of a certain number exceeds its one-ninth by 18. Find the number.
- **Ans.**Let the required number be *x*.
 - \therefore One-seventh of the number = $x \times \frac{1}{7} = \frac{x}{7}$.

One-ninth of the number = $x \times \frac{1}{9} = \frac{x}{9}$

According to the given condition

$$\frac{x}{7} = \frac{x}{9} + 18$$

$$\Rightarrow \qquad \frac{x}{7} - \frac{x}{9} = 18 \qquad \Rightarrow \qquad \frac{9x - 7x}{63} = 18$$

$$\Rightarrow \qquad \frac{2x}{63} = 18 \qquad \Rightarrow \qquad x = \frac{18 \times 63}{2}$$

$$\Rightarrow \qquad x = 9 \times 63 = 567$$

Hence, required number is 567.

- 14. A man leaves Rs. 115500 ; $\frac{1}{3}$ of it he leaves to his wife, $\frac{2}{7}$ of the rest to each of his two daughters and the remaining to his son. How much does his son get ?
- Ans.Total amount = Rs115500Math Class VIII19Question Bank





Wife's share $=\frac{1}{3} \times 115500 = \text{Rs} 38500$ Remaining amount = Rs (115500 - 38500) = Rs 77000Share of each daughter $=\frac{2}{7} \times 77000 = \frac{2 \times 77000}{7} = \text{Rs} 22000$ Share of two daughters $= 2 \times 22000 = \text{Rs} 44000$ Son's share = Rs [115500 - (38500 + 44000)]= 115500 - 82500 = Rs 33000.

15. A man donated $\frac{1}{10}$ of his money to a school, $\frac{1}{6}$ th of the remaining to a church and the remaining money he distributed equally among his three children. If each child gets Rs 50000, how much money did the man originally have ?

Ans.Let the man had originally Rs *x*.

Money donated to a school = $\frac{1}{10} \times x = \frac{x}{10}$ Remaining = $x - \frac{x}{10} = \frac{9x}{10}$ Money donated to church = $\frac{1}{6} \times \frac{9x}{10} = \frac{3x}{20}$ Remaining = $\frac{9x}{10} - \frac{3x}{20} = \frac{18x - 3x}{20}$ = $\frac{15x}{20} = \frac{3x}{4}$

Money distributed equally among his three children.

$$\therefore$$
 Each child gets money = $\frac{3x}{4} \times \frac{1}{3} = \frac{x}{4}$

As per condition

$$\frac{x}{4} = \text{Rs} 50000$$





$$x = 50000 \times 4 = \text{Rs} \ 200000$$

Hence, the man had originally Rs 200000.

16. A cake weighs 2 kg. If
$$\frac{2}{7}$$
 of its weight is flour, $\frac{1}{8}$ of its weight is
sugar, $\frac{3}{14}$ of its weight is milk and the rest is nuts and plums, find
the weight of nuts and plums in the cake.
Ans. Weight of the cake 2 kg
Weight of flour = $\frac{2}{7}$ of 2 kg = $\frac{4}{7}$ kg
Weight of sugar = $\frac{1}{8}$ of 2 kg = $\frac{4}{7}$ kg
Weight of milk = $\frac{3}{14}$ of 2 kg = $\frac{3}{7}$ kg
Weight of nut and plums = $2 - \left(\frac{4}{7} + \frac{1}{4} + \frac{3}{7}\right)$ kg
= $\left(2 - \frac{16 + 7 + 12}{28}\right)$ kg = $\left(2 - \frac{35}{28}\right)$ kg
= $\left(2 - \frac{5}{4}\right)$ kg = $\left(\frac{8 - 5}{4}\right)$ kg = $\frac{3}{4}$ kg
= $\frac{3}{4} \times 1000$ gm = 3×250 gm = 750 gm.
17. If $\frac{1}{8}$ of a pencil is black, $\frac{1}{2}$ of the remaining is white and the
remaining $3\frac{1}{2}$ cm is blue, find the total length of the pencil.
Ans. Let total length of the pencil is x cm.
Black part = $\frac{1}{8}$ of $x = \frac{x}{8}$
Remaining part = $x - \frac{x}{8} = \frac{8x - x}{8} = \frac{7x}{8}$

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White part
$$=$$
 $\frac{1}{2}$ of $\frac{7x}{8} = \frac{7x}{16}$
Remaining part $=$ $\frac{7x}{8} - \frac{7x}{16} = \frac{14x - 7x}{16} = \frac{7x}{16}$
 $\therefore \qquad \frac{7x}{16} = 3\frac{1}{2}$, which is blue (given)
 $\Rightarrow \qquad \frac{7x}{16} = \frac{7}{2} \qquad \Rightarrow \qquad x = \frac{7}{2} \times \frac{16}{7}$
 $\Rightarrow \qquad x = 8$

Hence, the total length of the pencil is 8 cm.

- **18.** Mohit spends $\frac{3}{7}$ of his monthly income on food and clothes and $\frac{7}{10}$ of the remainder on house rent. What fraction of income is left with him ? If money left is Rs 2400, what is his monthly income ?
- Ans. Let monthly income be Rs x.

Spent on food and clothes = Rs
$$\frac{3}{7}$$
 of $x = \text{Rs} \frac{3x}{7}$
Remaining = Rs $\left(x - \frac{3x}{7}\right) = \text{Rs} \frac{7x - 3x}{7} = \text{Rs} \frac{4x}{7}$
Spent on house rent = Rs $\frac{7}{10}$ of $\frac{4x}{7} = \text{Rs} \frac{2x}{5}$
Income left = Rs $\left(\frac{4x}{7} - \frac{2x}{5}\right)$
 $= \text{Rs} \left(\frac{20x - 14x}{35}\right) = \text{Rs} \frac{6x}{35}$
According to the given condition, $\frac{6x}{35} = 2400$
 $\Rightarrow \qquad x = \frac{2400 \times 35}{6} = 400 \times 35$



x = 14000

Thus, fraction of income is left = $\frac{6}{35}$ and his monthly income = Rs 14000.

19. A student was asked to multiply a given number by $\frac{8}{17}$. Instead,

he divided the given number by $\frac{8}{17}$. His answer was 225 more than the correct answer. What was the given number ?

Ans.Let given number be *x*.

Then in first case,
$$x \times \frac{8}{17} = \frac{8x}{17}$$

and in second case, $x \div \frac{8}{17} = x \times \frac{17}{8} = \frac{17x}{8}$
According to the given condition
 $\frac{17x}{8} - \frac{8x}{17} = 225$

$$\Rightarrow \qquad \frac{289x - 64x}{8 \times 17} = 225 \qquad \Rightarrow \qquad \frac{225x}{136} = 225$$
$$\Rightarrow \qquad x = \frac{225 \times 136}{225} = 136$$

Hence, required number is 136.

20. The highest score in an inning was $\frac{3}{11}$ of the total and the next highest was $\frac{3}{11}$ of the remainder. If the scores differed by 9, find the total score.

Ans.Let total score be *x*.

Then highest score =
$$\frac{3}{11}$$
 of $x = \frac{3x}{11}$
Next highest score = $\frac{3}{11} \left(x - \frac{3x}{11} \right) = \frac{3}{11} \times \frac{8x}{11} = \frac{24x}{121}$
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According to the given condition

$$\frac{3x}{11} - \frac{24x}{121} = 9$$

$$\frac{33x - 24x}{121} = 9 \implies \frac{9x}{121} = 9$$

$$\Rightarrow \qquad x = \frac{9 \times 121}{9} = 121$$

Hence, total score is 121.

21. In a school, $\frac{1}{5}$ th of the girls and $\frac{1}{8}$ th of the boys took part in a social camp. What fraction of the total strength took part in the camp?

Ans. Girls in a social camp = $\frac{1}{5}$

i.e., 1 girl out of 5.

Boys in a social camp = $\frac{1}{8}$

i.e., 1 boy out of 8.

 \therefore (1 + 1) pupils out of (5 + 8) pupil took part in the camp *i.e.* 2 pupils out of 13 pupil took part in the camp.

Hence, required fraction is $\frac{2}{13}$.

- **22.** A train starts full of passengers. At the first station, it drops one-third of the passengers and takes 280 more. At the second station, it drops one-half of the new total and takes 12 more. On arriving at the third station, it is found to have 248 passengers. Find the number of passengers in the beginning.
- **Ans.**Let total passengers in the beginning be *x*.

On the first station, number of Passengers dropped = $x \times \frac{1}{3} = \frac{x}{3}$ Remaining passenger = $\left(x - \frac{x}{3}\right) = \frac{2}{3}x$





Passengers taken = 280Hence, total passenger of the first station = $\frac{2}{3}x + 280$ On the second station, Number of passengers dropped = $\left(\frac{2}{3}x + 280\right)\frac{1}{2} = \frac{1}{3}x + 140$ Passengers taken = 12Hence, new total = $\frac{1}{3}x + 140 + 12 = \frac{1}{3}x + 152$ According to the given condtion $\frac{1}{3}x + 152 = 248$ $\frac{1}{3}x = 248 - 152 = 96$ $x = 96 \times \frac{3}{1} = 288$ Hence, total passengers in the beginning 288. 23. During a campaign, $\frac{1}{5}$ soldiers of a regiment were killed, $\frac{1}{3}$ died of diseases and $\frac{1}{25}$ were taken prisoners. What fraction of the regiment is left? **Ans.** Let total strength of soldiers in the regiment = xNumber of soldiers killed = $\frac{1}{5} \times x = \frac{x}{5}$ Soldiers who died from diseases = $\frac{1}{3} \times x = \frac{x}{3}$ Number of soldiers taken prisoners = $\frac{1}{25} \times x = \frac{x}{25}$ Remaining soldiers = $x - \frac{x}{5} - \frac{x}{3} - \frac{x}{25}$





$$= \frac{75x - 15x - 25x - 3x}{75}$$
$$= \frac{75x - 43x}{75} = \frac{32}{75}x$$
Hence, required fraction = $\frac{\frac{32x}{75}}{x} = \frac{32x}{75} \times \frac{1}{x} = \frac{32}{75}$.

24. The difference in values between $\frac{3}{7}$ of an estate and $\frac{4}{13}$ of the same estate is Rs 4,93,900 ; find the value of the estate.

Ans.Let the value of the estate be $\operatorname{Rs} x$

According to the given condition

$$\frac{3}{7}x - \frac{4}{13}x = 4,93,900$$

$$\Rightarrow \qquad \frac{39 - 28}{91}x = 4,93,900$$

$$\Rightarrow \qquad x = \frac{91 \times 4,93,900}{11} = 91 \times 44,900 = 40,85,900$$
Hence, required value of the estate is Rs 40.85,900

Hence, required value of the estate is Ks 40,85,900.

25. On a particular day, $\frac{2}{15}$ th of the total number of students in a school were absent. If 1950 students were present on that day, find the total strength of the school.

Ans.Let total strength of the school is *x*.

Number of students who were absent = $x \times \frac{2}{15} = \frac{2}{15}x$ \therefore Students who were present = $x - \frac{2}{15}x = \frac{13x}{15}$ According to the given condition, $\frac{13x}{15} = 1950$





$$\Rightarrow$$
 $x = \frac{15 \times 1950}{13} = 15 \times 150 = 2250$

Hence, total strength of school is 2250.

26. If $\frac{1}{4}$ of a number is added to $\frac{1}{3}$ of that number, the result is 15 greater than half of that number. Find the number.

Ans. Let the number be *x*.

	$\frac{1}{4}$ of the number $=\frac{x}{4}$		
	$\frac{1}{3}$ of the number $=\frac{x}{3}$		
and ha	alf of the number $=\frac{x}{2}$		
Accore	ding to the given conditior	1	
	$\frac{x}{4} + \frac{x}{3} = \frac{x}{2} + 1$	5	
\Rightarrow	$\frac{x}{4} + \frac{x}{3} - \frac{x}{2} = 15$	\Rightarrow	$\frac{3x + 4x - 6x}{12} = 15$
\Rightarrow	$\frac{7x-6x}{12} = 15$	\Rightarrow	$\frac{x}{12} = 15$
\Rightarrow	$x = 12 \times 1$	5 = 180)

Hence, the number is 180.

27. A student was asked to multiply a given number by $\frac{4}{5}$. By mistake, he divided the given number by $\frac{4}{5}$. His answer was 36 more than the correct answer. What was the given number?

Ans.Let the number be *x*





Multiply to given number by
$$\frac{4}{5} = \frac{4x}{5}$$

Divided the given number by $\frac{4}{5} = \frac{x}{4} = \frac{5x}{4}$
According to the given condition
 $\frac{5x}{4} - \frac{4x}{5} = 36$
 $\Rightarrow \qquad \frac{25x - 16x}{20} = 36 \qquad \Rightarrow \qquad \frac{9x}{20} = 36$
 $\Rightarrow \qquad x = 36 \times \frac{20}{9}$
 $\Rightarrow \qquad x = 4 \times 20 = 80$

Hence, the number is 80.