

- to the sum of the quotient and remainder, then what is the dividend.
3. In a division sum, the divisor is 10 times the quotient and 5 times the remainder. What is the dividend if the remainder is 460?
  4. In a division sum the divisor is 5 times and the quotient is 6 times the remainder which is 73. What is the number?
  5. The quotient is 702, the remainder is 24 and the divisor is 7 more than the sum of both. What is the number?
  6. In a division sum, the divisor is 10 times the quotient and 5 times the remainder. If the remainder is 48. Then find the dividend?
  7. In a division sum the divisor is 7239, quotient 1308 and the remainder is 209. By how much should the dividend be increased so that when it is divided by the same divisor quotient 1311 and remainder 730 is obtained?

#### Solution of Type- IV (Basic division)

$$1. \text{ Dividend} = \text{Divisor} \times \text{Quotient} + \text{Remainder}$$

**Given** :-  $Q = 120$

$$Dv = 456$$

$$R = 333$$

$$\text{then, Dividend} = 456 \times 120 + 333 \\ = 55053$$

$$2. Q = 105$$

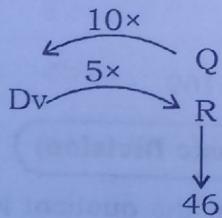
$$R = 195$$

$$Dv = Q + R$$

$$= 105 + 195 = 300 \text{ (given)}$$

$$\text{Dividend} = 300 \times 105 + 195 \\ = 31695$$

$$3.$$



$$Dv = 46 \times 5 = 230$$

$$Q \times 10 = Dv$$

$$Q = \frac{230}{10} = 23$$

$$R = 46$$

$$\begin{aligned} \text{Dividend} &= Dv \times Q + R \\ &= 230 \times 23 + 46 \\ &= 5336 \end{aligned}$$

$$4.$$

$$\begin{array}{ccc} 5x & & 5x \\ \swarrow & R & \searrow \\ Dv = 73 \times 5 & 73 & Q = 73 \times 6 \\ & = 365 & = 438 \\ \text{Dividend (Number)} & = 365 \times 438 + 73 & \\ & & = 159943 \end{array}$$

$$5.$$

$$Q = 702$$

$$R = 24$$

$$Dv = 702 + 24 + 7 \Rightarrow 733$$

$$\begin{aligned} \text{Dividend (Number)} &= 733 \times 702 + 24 \\ &\Rightarrow 514590 \end{aligned}$$

$$6.$$

$$\begin{array}{ccc} 10x & & Q \\ \swarrow & 5x & \searrow \\ Dv & R & \downarrow \\ & & 48 \\ Dv = 48 \times 5 & & \\ & & \end{array}$$

$$Q = \frac{48 \times 5}{10} = 24$$

$$\begin{aligned} \text{then; Dividend} &= 48 \times 5 \times 24 + 48 \\ &= 5808 \end{aligned}$$

$$7.$$

$$\begin{aligned} \text{First dividend} &= 7239 \times 1308 + 209 \\ &= 9468821 \end{aligned}$$

$$\begin{aligned} \text{IIInd dividend} &= 7239 \times 1311 + 730 \\ &= 9491059 \end{aligned}$$

$$\begin{aligned} \therefore \text{ Increase} &= 9491059 - 9468821 \\ &= 22238 \end{aligned}$$

#### Type - V

$$1. \sqrt{6 + \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}} \infty} = ?$$

$$2. \sqrt{12 + \sqrt{12 + \sqrt{12 + \dots}}} \infty = ?$$

$$3. \sqrt{20 - \sqrt{20 - \sqrt{20 - \sqrt{20 - \dots}}}} \infty = ?$$

$$4. \sqrt{30 + \sqrt{30 + \sqrt{30 + \dots}}} \infty = ?$$

$$5.$$

$$\sqrt{42 - \sqrt{42 - \sqrt{42 - \sqrt{42 - \dots \dots \infty}}} = ?}$$

6.

$$\sqrt{74 + \sqrt{700 \times \sqrt{42 + \sqrt{42 + \sqrt{42 + \dots \dots \infty}}}}} = ?$$

$$7. \sqrt{5 + \sqrt{5 + \sqrt{5 + \sqrt{5 + \dots \dots \infty}}}} = ?$$

$$8. \sqrt{7 - \sqrt{7 - \sqrt{7 - \sqrt{7 - \dots \dots \infty}}}} = ?$$

$$9. \sqrt{11 + \sqrt{11 + \sqrt{11 + \dots \dots \infty}}} = ?$$

$$10. \sqrt{9 - \sqrt{9 - \sqrt{9 - \sqrt{9 - \dots \dots \infty}}}} = ?$$

### Solution of Type - V

$$1. \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots \dots \infty}}}$$

take no.  $\Rightarrow$

$$\begin{array}{ccc} & 6 & \\ \swarrow & & \searrow \\ 2 & \times & 3 \end{array}$$

In the case of addition, larger no. will be the answer (Break in consecutive order) i.e. 3.

$$2. \sqrt{12 + \sqrt{12 + \sqrt{12 + \dots \dots \infty}}}$$

$$\begin{array}{c} \downarrow \\ 4 \times 3 \\ = 4 \end{array}$$

$$3. \sqrt{20 - \sqrt{20 - \sqrt{20 - \sqrt{20 - \dots \dots \infty}}}}$$

$$\begin{array}{ccc} & 20 & \\ \swarrow & & \searrow \\ 4 & \times & 5 \end{array}$$

[in case of subtraction]

the smaller number will be the answer i.e. 4.

$$4. \sqrt{30 + \sqrt{30 + \sqrt{30 + \dots \dots \infty}}}$$

$$\begin{array}{c} \downarrow \\ 5 \times 6 \text{ i.e. } 6 \end{array}$$

$$5. \sqrt{42 - \sqrt{42 - \sqrt{42 - \dots \dots \infty}}} = ?$$

$$\downarrow \\ 6 \times 7 \text{ i.e. } 6$$

$$6. \sqrt{74 + \sqrt{700 \times \sqrt{42 + \sqrt{42 + \sqrt{42 + \dots \dots \infty}}}}} = ?$$

$$\downarrow \\ 6 \times 7 \rightarrow \text{the largest number is taken}$$

$$\text{Now, } \sqrt{74 + \sqrt{700 \times 7}}$$

$$= \sqrt{74 + \sqrt{4900}}$$

$$= \sqrt{74 + 70}$$

$$= \sqrt{144} = 12$$

$$7. \sqrt{5 + \sqrt{5 + \sqrt{5 + \sqrt{5 + \dots \dots \infty}}}}$$

When numbers cannot be broken then we use formula

$$\text{as } \frac{\sqrt{4x+1}+1}{2}$$

$$\text{here } x = 5 \quad \frac{\sqrt{4 \times 5 + 1} + 1}{2} \Rightarrow \frac{\sqrt{21} + 1}{2}$$

$$\text{or, } \frac{\sqrt{21}}{2} + \frac{1}{2}$$

$$8. \sqrt{7 - \sqrt{7 - \sqrt{7 - \dots \dots \infty}}}$$

$$\text{use } \frac{\sqrt{4x+1}-1}{2}$$

$$\text{or, } \frac{\sqrt{4 \times 7 + 1} - 1}{2}$$

$$\frac{\sqrt{29}}{2} - \frac{1}{2}$$

$$9. \sqrt{11 + \sqrt{11 + \sqrt{11 + \dots \dots \infty}}}$$

$$\text{Put- } \frac{\sqrt{4x+1}+1}{2} = \frac{\sqrt{44+1}+1}{2}$$

$= \frac{\sqrt{45} + 1}{2}$  or the value will lie between 3 and 4.

10.  $\sqrt{9 - \sqrt{9 - \sqrt{9 - \dots \dots \infty}}}$

Put  $\frac{\sqrt{4x+1}-1}{2} = \frac{\sqrt{4 \times 9+1}-1}{2}$

$= \frac{\sqrt{37}-1}{2} \Rightarrow \frac{\sqrt{37}-1}{2}$  or  $\frac{\sqrt{37}}{4} - \frac{1}{2}$

#### Type- VI

1.  $\sqrt{8\sqrt{8\sqrt{8\sqrt{8\dots\dots\infty}}}} = ?$

2.  $\sqrt{3\sqrt{3\sqrt{3\sqrt{3\dots\dots\infty}}}} = ?$

3.  $\sqrt{7\sqrt{7\sqrt{7\sqrt{7\dots\dots\infty}}}} = ?$

4.  $\sqrt{5\sqrt{5\sqrt{5\sqrt{5\dots\dots\infty}}}} = ?$

5.  $\sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7\dots\dots\infty}}}}} = ?$

6.  $\sqrt{13\sqrt{13\sqrt{13\sqrt{13\dots\dots\infty}}}} = ?$

7.  $\sqrt{17\sqrt{17\sqrt{17\dots\dots\infty}} = ?}$

8.  $\sqrt{6\sqrt{6\sqrt{6\sqrt{6\sqrt{6\dots\dots\infty}}}}} = ?$

#### Solution of Type - VI

1.  $\sqrt{8\sqrt{8\sqrt{8\sqrt{8\sqrt{8\dots\dots\infty}}}}}$

**Note-** When number follows this type of process upto infinitive in multiplication then the number will be the answer i.e. 8.

2.  $\sqrt{3\sqrt{3\sqrt{3\sqrt{3\dots\dots\infty}}}}$

↓  
3

3.  $\sqrt{7\sqrt{7\sqrt{7\sqrt{7\dots\dots\infty}}}}$   
↓  
7

4.  $\sqrt{5\sqrt{5\sqrt{5\sqrt{5\dots\dots\infty}}}}$

When process is not upto infinitive  
then use formula  $= N^{\frac{2^{t-1}}{2^t}} \rightarrow 5^{\frac{2^{4-1}}{2^4}} \text{ or } \frac{15}{16}$

(Here N is the digit and t is the number of times the digit is repeated)

5.  $\sqrt{7\sqrt{7\sqrt{7\sqrt{7\sqrt{7\dots\dots\infty}}}}}$

7 comes five times

$\therefore 7^{\frac{2^{5-1}}{2^5}} \Rightarrow 7^{\frac{31}{32}}$

6.  $\sqrt{13\sqrt{13\sqrt{13\sqrt{13\dots\dots\infty}}}}$

13 comes four times

$13^{\frac{2^{4-1}}{2^4}} \text{ or } 13^{\frac{15}{16}}$

7.  $\sqrt{17\sqrt{17\sqrt{17\dots\dots\infty}}}$

↓ → here process in infinite.  
17

8.  $\sqrt{6\sqrt{6\sqrt{6\sqrt{6\sqrt{6\dots\dots\infty}}}}}$

6 comes 6 times

$6^{\frac{2^{6-1}}{2^6}} \Rightarrow 6^{\frac{63}{64}}$

#### Type - VII

1.  $\sqrt{248 + \sqrt{52 + \sqrt{144}}} = ?$

2.  $\sqrt{134 + \sqrt{86 + \sqrt{196}}} = ?$

$$3. \sqrt{4 + \sqrt{44 + \sqrt{10000}}} = ?$$

$$4. \sqrt{5 + \sqrt{11 + \sqrt{19 + \sqrt{29 + \sqrt{49}}}}} = ?$$

$$5. \sqrt{20 + \sqrt{29 - \sqrt{12 + \sqrt{19 - \sqrt{19}}}}} = ?$$

$$6. \sqrt{4 + \sqrt{21 + \sqrt{13 + \sqrt[3]{19 + \sqrt{64}}}}} = ?$$

### Solution of Type - VII

$$1. \sqrt{248 + \sqrt{52 + \sqrt{144}}}$$

$$= \sqrt{248 + \sqrt{52 + 12}}$$

$$= \sqrt{248 + \sqrt{64}}$$

$$= \sqrt{248 + 8}$$

$$= \sqrt{256}$$

$$= 16$$

$$2. \sqrt{134 + \sqrt{86 + \sqrt{196}}}$$

$$= 12$$

$$\sqrt{134 + \sqrt{86 + \sqrt{196}}}$$

**Step-1:**  $\sqrt{196} = 14$   
**Step-2:**  $\sqrt{86+14} = \sqrt{100}$   
**Step-3:**  $\sqrt{100} = 10$   
**Step-4:**  $\sqrt{134+10} = \sqrt{144}$   
**Step-5:**  $\sqrt{144} = 12$

$$3. \sqrt{4 + \sqrt{44 + \sqrt{10000}}}$$

or

$$\sqrt{4 + \sqrt{44 + \sqrt{10000}}}$$

$$= \sqrt{4 + \sqrt{44 + 100}}$$

$$= \sqrt{4 + \sqrt{144}}$$

$$= \sqrt{4 + 12}$$

$$= \sqrt{16}$$

$$= 4$$

$$4. \sqrt{5 + \sqrt{11 + \sqrt{19 + \sqrt{29 + \sqrt{49}}}}}$$

or

$$\sqrt{5 + \sqrt{11 + \sqrt{19 + \sqrt{29 + \sqrt{49}}}}}$$

$$= \sqrt{5 + \sqrt{11 + \sqrt{19 + \sqrt{36}}}}$$

$$= \sqrt{5 + \sqrt{11 + \sqrt{25}}}$$

$$= \sqrt{5 + \sqrt{16}}$$

$$= \sqrt{5 + 4}$$

$$= \sqrt{9}$$

$$= 3$$

5.  $\sqrt{20 + \sqrt{29 - \sqrt{12 + \sqrt{19 - \sqrt{9}}}}}$

or

$$\begin{aligned} & \sqrt{20 + \sqrt{29 - \sqrt{12 + \sqrt{19 - \sqrt{9}}}}} \\ &= \sqrt{20 + \sqrt{29 - \sqrt{12 + \sqrt{16}}}} \\ &= \sqrt{20 + \sqrt{29 - \sqrt{16}}} \\ &= \sqrt{20 + \sqrt{25}} = \sqrt{25} \\ &= 5 \end{aligned}$$

6.  $\sqrt[4]{4 + \sqrt{21 + \sqrt{13 + \sqrt[3]{19 + \sqrt{64}}}}}$

or

$$\begin{aligned} & \sqrt[4]{4 + \sqrt{21 + \sqrt{13 + \sqrt[3]{19 + \sqrt{64}}}}} \\ &= \sqrt[4]{4 + \sqrt{21 + \sqrt{13 + \sqrt[3]{19 + 8}}}} \\ &= \sqrt[4]{4 + \sqrt{21 + \sqrt{13 + 3}}} \\ &= \sqrt[4]{4 + \sqrt{21 + 4}} \\ &= \sqrt[4]{4 + 5} = \sqrt{9} \\ &= 3 \end{aligned}$$

### Type - VIII

1.  $\sqrt{4096} + \sqrt{40.96} + \sqrt{0.4096} +$

$$\sqrt{0.004096} = ?$$

2.  $\sqrt{15625} + \sqrt{156.25} + \sqrt{1.5625} +$   
 $\sqrt{0.015625} = ?$

3.  $\sqrt{0.01} + \sqrt{0.81} + \sqrt{1.21} + \sqrt{0.0009} = ?$

4.  $\sqrt{0.6084} + \sqrt{0.006084} + \sqrt{60.84} +$   
 $\sqrt{0.00006084} = ?$

5.  $\sqrt{7396} + \sqrt{0.7396} + \sqrt{0.007396} +$   
 $\sqrt{0.00007396} = ?$

### Solution of Type - VIII

1.

$$\sqrt{4096} + \sqrt{40.96} + \sqrt{0.4096} + \sqrt{0.004096}$$

$$\begin{array}{ccccccccc} \downarrow & + & \downarrow & + & \downarrow & + & \downarrow \\ 64 & + & 6.4 & + & 0.64 & + & 0.064 \\ = 71.104 \end{array}$$

2.  $\sqrt{15625} + \sqrt{156.25} + \sqrt{1.5625}$

$$\begin{array}{ccccccccc} \downarrow & + & \downarrow & + & \downarrow \\ 125 & + & 12.5 & + & 1.25 \\ = & \sqrt{0.015625} \end{array}$$

$$\begin{array}{c} \downarrow \\ 0.125 \\ = 138.875 \end{array}$$

3.  $\sqrt{0.01} + \sqrt{0.81} + \sqrt{1.21} + \sqrt{0.0009}$

$$\begin{array}{ccccccccc} \downarrow & + & \downarrow & + & \downarrow & + & \downarrow \\ 0.1 & + & 0.9 & + & 1.1 & + & 0.03 \\ = 2.13 \end{array}$$

$$4. \quad \sqrt{0.6084} + \sqrt{0.006084} + \sqrt{60.84}$$

$$\begin{array}{ccccccc} \downarrow & + & \downarrow & + & \downarrow \\ 0.78 & + & 0.078 & + & 7.8 \\ + \sqrt{0.00006084} \\ \downarrow \\ 0.0078 \\ = 8.6658 \end{array}$$

$$5. \quad \sqrt{7396} + \sqrt{0.7396} + \sqrt{0.007396}$$

$$\begin{array}{ccccccc} \downarrow & \downarrow & \downarrow \\ 86 & + & 0.86 & + & 0.086 \\ + \sqrt{0.00007396} \\ \downarrow \\ 0.0086 = 86.9546 \end{array}$$

**Note:** In every number, if the decimal is after 4 digits from left then in the square root it is after 2 digit. In every case of square root the number of digit after decimal becomes half.

#### Type - IX

$$1. \quad \sqrt{256} \div \sqrt{x} = 2, \text{ then find the value of } x.$$

$$2. \quad \sqrt{\frac{x}{169}} = \frac{54}{39}, \text{ then find the value of } x.$$

$$3. \quad \sqrt{1 + \frac{27}{169}} = 1 + \frac{x}{13}, \text{ then find the value of } x.$$

#### Solution of Type - IX

$$1. \quad \sqrt{256} \div \sqrt{x} = 2$$

$$\Rightarrow \sqrt{\frac{256}{x}} = 2$$

(squaring both the sides)

$$\frac{256}{x} = 4$$

$$x = 64$$

$$2. \quad \sqrt{\frac{x}{169}} = \frac{54}{39}$$

$$\frac{\sqrt{x}}{13} = \frac{54}{39}$$

$$\sqrt{x} = 18$$

squaring both the sides  
 $x = 324$

$$3. \quad \sqrt{1 + \frac{27}{169}} = 1 + \frac{x}{13}$$

$$\sqrt{\frac{196}{169}} = 1 + \frac{x}{13}$$

$$\frac{14}{13} - 1 = \frac{x}{13}$$

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

$$x = 1$$

#### Fraction

The word fraction means a part of anything. It can be expressed in the form

of  $\frac{p}{q}$  where  $p$  and  $q$  are integers and ' $q$ '

is not equal to '0'.

**Proper fraction :** When the numerator is less than the denominator, then the fraction is called a proper fraction.

E.g:  $\frac{7}{12}, \frac{5}{17}, \frac{12}{43}$  etc.

**Improper Fraction :** When the numerator is greater than the denominator, then the fraction is called an improper fraction.

E.g:  $\frac{17}{13}, \frac{18}{14}, \frac{45}{19}$  etc.

**Like fraction :** Fractions having same denominator are called like fraction.

E.g:  $\frac{1}{9}, \frac{5}{9}, \frac{7}{9}$  etc.

**Unlike fraction :** Fractions having different denominators are called unlike fractions.

E.g:  $\frac{14}{23}, \frac{17}{43}, \frac{53}{19}$  etc.

**Compound fraction :** It is a fraction of a fraction.

E.g:  $\frac{1}{3}$  of  $\frac{5}{9}$ ,  $\frac{7}{9}$  of  $\frac{61}{53}$  of  $\frac{5}{12}$ ,  $\frac{9}{13}$  of  $\frac{7}{19}$

etc.

**Complex fraction :** In such a fraction, both the numerator and the denominator are fractions.

E.g:  $\frac{\frac{12}{13}}{\frac{17}{71}}, \frac{\frac{5}{17} + \frac{13}{72}}{\frac{74}{43} + \frac{7}{9}}$  etc.

**Mixed fraction :** Those fractions which consists of a whole number and a proper fraction, are known as mixed fraction.

E.g:  $5\frac{7}{8}, 7\frac{4}{9}, 12\frac{13}{17}$  etc.

**Continued fraction :** It contains an additional fraction in the numerator or in the denominator.

E.g:  $12 + \frac{1}{13 + \frac{14}{65 + \frac{2}{3}}}, 5 + \frac{1}{40 + \frac{7}{1 + \frac{2}{3}}}$  etc.

**Decimal fraction :** In such a fraction, the denominator has power of 10.

$$0.45 = \frac{45}{100}, \quad 0.7 = \frac{7}{10},$$

$$0.000071 = \frac{71}{1000000} \text{ etc.}$$

### Exercise

1. Which is the largest fraction among  $\frac{3}{8}, \frac{3}{5}, \frac{2}{3}$  and  $\frac{1}{2}$ 
  - (A)  $\frac{2}{3}$
  - (B)  $\frac{3}{5}$
  - (C)  $\frac{1}{2}$
  - (D)  $\frac{3}{8}$
2. Which is the largest of the following fractions?
 
$$\frac{2}{3}, \frac{3}{5}, \frac{8}{11}, \frac{7}{9}, \frac{11}{17}$$
  - (A)  $\frac{2}{3}$
  - (B)  $\frac{11}{17}$
  - (C)  $\frac{7}{9}$
  - (D)  $\frac{3}{5}$
3. Which is the smallest fraction among the following fractions?
 
$$\frac{3}{7}, \frac{8}{13}, \frac{2}{5}, \frac{7}{9}, \frac{11}{15}$$
  - (A)  $\frac{2}{5}$
  - (B)  $\frac{3}{7}$
  - (C)  $\frac{7}{9}$
  - (D)  $\frac{8}{13}$
4. What is the difference between the largest and the smallest fractions out of the fractions given below?
 
$$\frac{5}{8}, \frac{21}{35}, \frac{9}{16} \text{ and } \frac{6}{7}$$
  - (A)  $\frac{33}{112}$
  - (B)  $\frac{35}{112}$
  - (C)  $\frac{72}{112}$
  - (D)  $\frac{13}{112}$

5. Which one of the following groups is in descending order?

- (A)  $\frac{4}{7}, \frac{9}{17}, \frac{5}{11}, \frac{7}{16}$   
 (B)  $\frac{7}{16}, \frac{5}{11}, \frac{9}{17}, \frac{4}{7}$   
 (C)  $\frac{9}{17}, \frac{5}{11}, \frac{7}{16}, \frac{4}{7}$   
 (D)  $\frac{4}{7}, \frac{5}{11}, \frac{9}{17}, \frac{7}{16}$

6. Which one of the group is in descending order?

- (A)  $\frac{7}{12}, \frac{9}{17}, \frac{13}{24}$   
 (B)  $\frac{13}{24}, \frac{9}{17}, \frac{7}{12}$

7. Find the ascending order of the fractions  
 $\frac{11}{14}, \frac{16}{19}, \frac{11}{21}$   
 $\frac{11}{21}, \frac{16}{19}, \frac{11}{14}$   
 $\frac{11}{14}, \frac{16}{19}, \frac{11}{21}$   
 $\frac{11}{14}, \frac{16}{19}, \frac{11}{16}$

- (A)  $\frac{11}{21}, \frac{16}{19}, \frac{11}{14}$   
 (B)  $\frac{11}{14}, \frac{11}{16}, \frac{11}{19}$   
 (C)  $\frac{11}{14}, \frac{16}{19}, \frac{11}{21}$   
 (D)  $\frac{11}{14}, \frac{11}{21}, \frac{16}{19}$

8. Which one of the following fractions is greater than  $\frac{3}{4}$ ?

- (A)  $\frac{35}{71}$   
 (B)  $\frac{19}{61}$   
 (C)  $\frac{71}{101}$   
 (D)  $\frac{33}{100}$

9. Which one of the following fractions is greater than  $\frac{1}{3}$ ?

- (A)  $\frac{27}{82}$   
 (B)  $\frac{20}{61}$   
 (C)  $\frac{16}{45}$   
 (D)  $\frac{11}{18}$

10.  $1\frac{1}{2} + 11\frac{1}{2} + 111\frac{1}{2} + 1111\frac{1}{2} + 11111\frac{1}{2} = ?$

- (A)  $12347\frac{1}{2}$   
 (B)  $12346\frac{1}{2}$   
 (C)  $12345\frac{1}{2}$   
 (D)  $12344\frac{1}{2}$

11.  $9\frac{1}{2} + 99\frac{1}{2} + 999\frac{1}{2} + 9999\frac{1}{2} = ?$   
 (A) 11106  
 (B) 11107  
 (C) 11108  
 (D) 11109

12.  $3\frac{2}{3} + 5\frac{1}{2} + 6\frac{3}{5} + 7\frac{2}{5} + 3\frac{7}{10} = ?$   
 (A)  $26\frac{13}{15}$   
 (B)  $25\frac{14}{15}$   
 (C)  $24\frac{13}{15}$   
 (D)  $26\frac{19}{20}$

13.  $999\frac{1}{7} + 999\frac{2}{7} + 999\frac{3}{7} + 999\frac{4}{7} + 999\frac{5}{7} + 999\frac{6}{7} = ?$   
 (A) 5995  
 (B) 5997  
 (C) 5996  
 (D) 5998

14.  $3\frac{1}{3} + 33\frac{1}{3} + 333\frac{1}{3} + 3333\frac{1}{3} + 33333\frac{1}{3} = ?$

- (A)  $37031\frac{2}{3}$   
 (B)  $37037\frac{1}{3}$   
 (C)  $37036\frac{2}{3}$   
 (D)  $37032\frac{1}{3}$

15.  $\frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} + \frac{1}{42} + \frac{1}{56} + \frac{1}{72} = ?$

- (A)  $\frac{5}{18}$   
 (B)  $\frac{7}{18}$   
 (C)  $\frac{11}{18}$   
 (D)  $\frac{13}{18}$

16.  $\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \dots + \frac{1}{110} = ?$

- (A)  $\frac{7}{8}$   
(B)  $\frac{9}{10}$   
(C)  $\frac{10}{11}$   
(D)  $\frac{11}{12}$

17.  $\frac{1}{20} + \frac{1}{30} + \frac{1}{42} + \dots + \frac{1}{132} = ?$

- (A)  $\frac{1}{6}$   
(B)  $\frac{2}{5}$   
(C)  $\frac{3}{4}$   
(D)  $\frac{4}{5}$

18.  $\frac{1}{9} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \dots + \frac{1}{72} = ?$

- (A) 0.5  
(B) 0.33  
(C) 0.66  
(D) 0.77

19.  $\frac{1}{11} + \frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \dots + \frac{1}{90} + \frac{1}{110} = ?$

- (A) 4  
(B) 3  
(C) 2  
(D) 1

20.  $\frac{1}{5.9} + \frac{1}{9.13} + \frac{1}{13.17} + \dots + \frac{1}{61.65} = ?$

- (A)  $\frac{4}{45}$   
(B)  $\frac{3}{65}$

- (C)  $\frac{2}{35}$   
(D)  $\frac{3}{35}$

21.  $\frac{1}{2 \times 5} + \frac{1}{5 \times 8} + \frac{1}{8 \times 11} + \dots + \frac{1}{23 \times 26} = ?$

- (A)  $\frac{1}{11}$   
(B)  $\frac{3}{11}$   
(C)  $\frac{2}{13}$   
(D)  $\frac{4}{13}$

- (A)  $\frac{1}{19}$   
(B)  $\frac{1}{18}$   
(C)  $\frac{1}{3}$   
(D)  $\frac{1}{2}$

16.  $\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \dots + \frac{1}{110} = ?$

- (A)  $\frac{99}{100}$   
(B)  $\frac{49}{50}$   
(C)  $\frac{199}{200}$   
(D)  $\frac{149}{150}$

23.

$\frac{5}{2^2 \times 3^2} + \frac{7}{3^2 \times 4^2} + \frac{9}{4^2 \times 5^2} + \dots + \frac{39}{19^2 \times 20^2} = ?$

- (A)  $\frac{99}{400}$   
(B)  $\frac{299}{300}$   
(C)  $\frac{299}{200}$   
(D)  $\frac{399}{100}$

24.  $\left(1 + \frac{1}{2}\right) \left(1 + \frac{1}{3}\right) + \left(1 + \frac{1}{4}\right) \left(1 + \frac{1}{5}\right) + \dots + \left(1 + \frac{1}{x}\right) = ?$

- (A)  $\frac{x+2}{x+1}$   
(B)  $\frac{x+2}{x+3}$   
(C)  $\frac{x+1}{3}$   
(D)  $\frac{x+1}{2}$

25.

$\left(1 + \frac{1}{2}\right) \left(1 + \frac{1}{3}\right) \left(1 + \frac{1}{4}\right) \left(1 + \frac{1}{5}\right) + \dots + \left(1 + \frac{1}{29}\right) = ?$

- (A) 13  
(B) 14  
(C) 15  
(D) 16

$\left(1 - \frac{1}{2}\right) \left(1 - \frac{1}{3}\right) \left(1 - \frac{1}{4}\right) + \dots + \left(1 - \frac{1}{x}\right) = ?$

- (A) x  
(B)  $\frac{1}{x}$   
(C)  $x-1$   
(D)  $\frac{1}{x-1}$

$\left(1 - \frac{1}{2}\right) \left(1 - \frac{1}{3}\right) \left(1 - \frac{1}{4}\right) + \dots + \left(1 - \frac{1}{19}\right) = ?$

- (A)  $\frac{1}{19}$   
(B)  $\frac{1}{18}$   
(C)  $\frac{1}{3}$   
(D)  $\frac{1}{2}$

28.  $\left(1 - \frac{1}{5}\right)\left(1 - \frac{1}{6}\right)\left(1 - \frac{1}{7}\right) \dots \left(1 - \frac{1}{39}\right) = ?$
- (A)  $\frac{2}{39}$    (B)  $\frac{4}{39}$   
 (C)  $\frac{6}{39}$    (D)  $\frac{8}{39}$
29.  $\left(1 - \frac{1}{2}\right)\left(1 - \frac{1}{3}\right)\left(1 - \frac{1}{4}\right) \dots \left(1 - \frac{1}{70}\right)$
- $= \frac{x}{70}$ , then find the value of  $x$ .
- (A) 4   (B) 3  
 (C) 2   (D) 1
30.  $\left(1 - \frac{1}{2^2}\right)\left(1 - \frac{1}{3^2}\right)\left(1 - \frac{1}{4^2}\right) \dots \left(1 - \frac{1}{90^2}\right) = ?$
- (A)  $\frac{89}{91}$    (B)  $\frac{90}{91}$   
 (C)  $\frac{91}{180}$    (D)  $\frac{1}{90}$
31. Find the value of  $1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2}}}$ .
33. Find the value of  $2 + \frac{1}{2 + \frac{1}{2 + \frac{1}{2 + \frac{1}{3}}}}$ .
- (A)  $\frac{99}{37}$    (B)  $\frac{99}{41}$   
 (C)  $\frac{99}{253}$    (D)  $\frac{99}{55}$
34. Find the value of  $3 + \frac{2}{3 + \frac{2}{3 + \frac{2}{3 + \frac{2}{3}}}}$ .
- (A)  $\frac{58}{139}$    (B)  $\frac{48}{139}$   
 (C)  $\frac{68}{139}$    (D)  $\frac{78}{139}$
35. Find the value of  $3 + \frac{5}{4 + \frac{5}{4 + \frac{5}{4 + \frac{5}{2 + \frac{3}{2 + \frac{3}{5}}}}}}$ .
- (A)  $\frac{245}{274}$    (B)  $\frac{245}{284}$   
 (C)  $\frac{274}{285}$    (D)  $\frac{235}{265}$
36. If  $\frac{3}{2 + \frac{2}{2 + \frac{2}{2 + \frac{2}{3}}}} = x$ , then find the value of  $x$ .
- (A)  $\frac{21}{13}$    (B)  $\frac{8}{13}$   
 (C)  $\frac{13}{21}$    (D)  $\frac{13}{8}$

**Fractions (Solution)**

37. Find the value of  $1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{x}}}}$ .

(A)  $\frac{5x+3}{3x+2}$

(B)  $\frac{7x+3}{5x+2}$

(C)  $\frac{3x+3}{7x+2}$

(D)  $\frac{11x+3}{9x+2}$

38. Find the value of  $1 - \frac{1}{1 - \frac{1}{1 - \frac{1}{1 - \frac{1}{x}}}}$ .

(A)  $\frac{x+1}{x}$

(B)  $\frac{x}{x+1}$

(C)  $\frac{x}{x-1}$

(D)  $\frac{x-1}{x}$

39. What is the simplest value of

$$\left[ 1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{3}}}} \right] \div 1\frac{4}{7} = ?$$

(A) 3

(B) 1

(C) 2

(D) 4

40. If  $x + \frac{1}{2 + \frac{1}{3 + \frac{1}{4 + \frac{1}{5}}}} = 12$ , then find the value of  $x$ .

(A)  $\frac{1816}{157}$

(B)  $\frac{2012}{153}$

(C)  $\frac{1818}{151}$

(D)  $\frac{1818}{157}$

1.(A); Taking LCM of 8,5,3 and 2 i.e. 120, than, multiplying every fraction by 120.

$$\frac{3}{8} \times 120, \frac{3}{5} \times 120, \frac{2}{3} \times 120, \frac{1}{2} \times 120$$

↓      ↓      ↓      ↓

45      72      80      60

80 > 72 > 60 > 45

80 i.e.  $\frac{2}{3}$  is largest

**Short method:** Taking two fraction at a time

$$\frac{3}{8} \cancel{\times} \frac{3}{5}$$

15 < 24

Taking greater of these two fractions and the next one

$$\frac{3}{5} \cancel{\times} \frac{2}{3}$$

9 < 10

Taking greater of these two fractions and the next one

$$\frac{2}{3} \cancel{\times} \frac{1}{2}$$

4 > 3

i.e.  $\frac{2}{3}$  is the largest

2.(C);

$$\frac{2}{3} \cancel{\times} \frac{3}{5}$$

10 > 9

Taking greater of these two fractions and the next one

$$\frac{2}{3} \cancel{\times} \frac{8}{11}$$

22 < 24

Taking greater of these two fractions and the next one

$$\frac{8}{11} \cancel{\times} \frac{7}{9}$$

72 > 17

Taking greater of these two fractions and the next one

$$\frac{7}{9} \cancel{\times} \frac{11}{17}$$

119 > 99

$\frac{7}{9}$  is the largest

3.(A);  $\frac{3}{7}, \frac{8}{13}, \frac{2}{15}, \frac{7}{9}, \frac{11}{15}$

$$\frac{3}{7} \cancel{\times} \frac{8}{13}$$

39 < 56

Taking smaller of these two fractions and the next one

$$\frac{3}{7} \cancel{\times} \frac{2}{5}$$

15 > 14

Taking smaller of these two fractions and the next one

$$\frac{2}{5} \cancel{\times} \frac{7}{9}$$

18 < 35

Taking smaller of these two fractions and the next one

$$\frac{2}{5} \cancel{\times} \frac{11}{15}$$

30 < 55

$\frac{2}{5}$  is the smallest

