

RATIO & PROPORTION

CLASS-3

Q) If $l = \frac{6}{5}$ of m , and $m = \frac{5}{8}$ of n , then the ratio of $l:n$ is -

यदि $l = m$ का $\frac{6}{5}$ और $m = n$ का $\frac{5}{8}$ तो $l:n$ ज्ञात करें।

$$l = m \times \frac{6}{5}$$

$$\frac{l}{m} = \frac{6}{5} \Rightarrow \boxed{l:m}$$

$$m = n \times \frac{5}{8}$$

$$\frac{m}{n} = \frac{5}{8} \Rightarrow \boxed{m:n}$$

$$l:m:n$$

$$6:5:8$$

$$l:n$$

$$6:8$$

$$3:4$$

II method

$$l = m \times \frac{6}{5} \quad | \quad m = n \times \frac{5}{8}$$

$$l = n \times \frac{5}{8} \times \frac{6}{5}$$

$$l = n \times \frac{3}{4}$$

$$\frac{l}{n} = \frac{3}{4}$$

Q) If $x = \frac{1}{3}y$ and $y = \frac{1}{2}z$, then $x:y:z$ is equal to

यदि $x = \frac{1}{3}y$ और $y = \frac{1}{2}z$, तो $x:y:z$ बराबर है।

$$\frac{x}{y} = \frac{1}{3} \quad \boxed{x : y = 1 : 3}$$

$$\frac{y}{z} = \frac{1}{2} \quad \boxed{y : z = 1 : 2}$$

$$\begin{array}{r} x : y : z \\ 1 : 3 \quad \boxed{3} \\ \boxed{1} : 1 : 2 \\ \hline 1 : 3 : 6 \end{array}$$

Q If $A : B = \frac{1}{2} : \frac{3}{8}$, $B : C = \frac{1}{3} : \frac{5}{9}$ and $C : D = \frac{5}{6} : \frac{3}{4}$

then the ratio $A : B : C : D$ is

यदि $A : B = \frac{1}{2} \times \frac{3}{8}$, $B : C = \frac{1}{3} \times \frac{5}{9}$ और $C : D = \frac{5}{6} \times \frac{3}{4}$

तो अनुपात $A : B : C : D$ है।

$$A : B = 8 : 6 = 4 : 3$$

$$B : C = 9 : 15 = 3 : 5$$

$$C : D = 20 : 18 = 10 : 9$$

$$\begin{array}{r} A : B : C : D \\ 120 : 90 : 180 : 135 \\ \hline 8 : 6 : 10 : 9 \end{array}$$

Q If $A : B = \frac{1}{3} : \frac{1}{5}$, $B : C = \frac{1}{7} : \frac{1}{8}$ and $C : D = \frac{1}{10} : \frac{1}{21}$

then the value of $A : B : C : D$ is —.

यदि $A : B = \frac{1}{3} : \frac{1}{5}$, $B : C = \frac{1}{7} : \frac{1}{8}$ और $C : D = \frac{1}{10} : \frac{1}{21}$

तो $A : B : C : D$ का मान — है।

$$A : B = 5 : 3$$

$$B : C = 8 : 7$$

$$C : D = 21 : 10$$

$$A : B : C : D$$

$$\cancel{840} : \cancel{504} : \cancel{441} : \cancel{210}$$

$$40 : 24 : 21 : 10$$

Type - III

Q If $a:b = 3:5$, $b:c = 7:8$ and $c:d = 2:3$, then $2a:3d$ is equal to:

यदि $a:b = 3:5$, $b:c = 7:8$ और $c:d = 2:3$ हो, तो $2a:3d$ का मान ज्ञात करें।

$$a : b = 3 : 5$$

$$b : c = 7 : 8$$

$$c : d = 2 : 3$$

$$\begin{array}{cccc} a & : & b & : & c & : & d \\ 42 & : & & & & : & 120 \end{array}$$

$$a : d$$

$$\cancel{42} : \cancel{120}$$

$$7 : 20$$

$$\begin{array}{cc} 2a & : & 3d \\ 2 \times 7 & : & 3 \times 20 \end{array}$$

$$\cancel{14} : \cancel{60}$$

$$7 : 30$$

$$\bullet \quad \begin{array}{c} a : b \\ 2 : 3 \\ 2k, 3k \end{array} \Rightarrow \frac{2a+3b}{7a-2b}$$

$$= \frac{2 \times 2k + 3 \times 3k}{7 \times 2k - 2 \times 3k}$$

$$\frac{4k+9k}{14k-6k} = \frac{13k}{8k} = \left(\frac{13}{8} \right)$$

* Degree Of Equation

↳ हमेशा Variables की होती है।

- $2\overset{\textcircled{1}}{a} + 3\overset{\textcircled{1}}{b} = 1$
- $2\overset{\textcircled{2}}{a}^2 + 3\overset{\textcircled{2}}{b}^2 = 2$
- $2\overset{\textcircled{1}}{a} \times 3\overset{\textcircled{1}}{b} = 1 + 1 = 2$
- $2\overset{\textcircled{2}}{a}^2 + 3\overset{\textcircled{1}}{b}\overset{\textcircled{1}}{c} = 2$

* $\frac{2\overset{\textcircled{1}}{a} + 3\overset{\textcircled{1}}{b}}{3\overset{\textcircled{1}}{a} - 2\overset{\textcircled{1}}{b}} = \frac{1}{1}$

$\boxed{a:b = 3:2} \Rightarrow \frac{3\overset{\textcircled{1}}{a} + 2\overset{\textcircled{1}}{b}}{3\overset{\textcircled{1}}{a} - 2\overset{\textcircled{1}}{b}} = \frac{1}{1}$
 $\downarrow \quad \downarrow$
 $3k \quad 2k$

⑧ $\frac{3a + 2b}{3a - 2b} = \frac{1}{1}$ X

Cannot be determined

⑨ $\frac{3a + 2b}{3a^2 - 2b^2}$ X

$\frac{9k + 4k}{27k^2 - 8k^2} = \frac{13k}{19k^2} = \frac{13}{19k}$

Q If $a:b = 2:5$, then the value of $(2a + 3b):(7a + 5b)$ is

यदि $a:b = 2:5$, तो $(2a + 3b):(7a + 5b)$ का मान है।

$\frac{2a + 3b}{7a + 5b}$

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

$\frac{4 + 15}{14 + 25} = \frac{19}{39}$

Q) If $\frac{A}{B} = \frac{1}{2}$, then what is the value of $\left(\frac{3}{4} + \frac{B-A}{B+A}\right)$
 यदि $\frac{A}{B} = \frac{1}{2}$, तो $\left(\frac{3}{4} + \frac{B-A}{B+A}\right)$ का मान क्या है ?

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

$$\frac{3}{4} + \frac{1}{3} = \frac{9+4}{12} = \frac{13}{12}$$

Q) If $a:b = 3:4$, $b:c = 4:7$, then $\frac{A+B+C}{C}$ is equal to
 यदि $a:b = 3:4$, $b:c = 4:7$, तो $\frac{A+B+C}{C}$ बराबर है।

$$\begin{array}{l} a : b = 3 : 4 \\ b : c = 4 : 7 \end{array}$$

$$\begin{array}{l} a : b : c \\ 3 : 4 : 7 \end{array}$$

$$\frac{a+b+c}{C} = \frac{3+4+7}{7} = \frac{14}{7} = 2$$

Q) If $\frac{a}{b} = \frac{4}{5}$ and $\frac{b}{c} = \frac{15}{16}$, then $\frac{c^2 - a^2}{c^2 + a^2}$ would be
 यदि $\frac{a}{b} = \frac{4}{5}$ और $\frac{b}{c} = \frac{15}{16}$, तो $\frac{c^2 - a^2}{c^2 + a^2}$ होगा

$$\begin{array}{l|l} a : b & b : c \\ 4 : 5 & 15 : 16 \\ \hline \times 3 & \times 3 \\ 12 : 15 & \end{array}$$

$$\boxed{a : b : c} \\ \boxed{12 : 15 : 16}$$

$$\frac{16^2 - 12^2}{16^2 + 12^2} = \frac{256 - 144}{256 + 144}$$

$$= \frac{112}{400} = \frac{7}{25}$$

Q If $\frac{x}{2} = \frac{y}{3} = \frac{z}{4} = \frac{2x-3y+5z}{k}$, then the value of k is

यदि $\frac{x}{2} = \frac{y}{3} = \frac{z}{4} = \frac{2x-3y+5z}{k}$, तो k का मान है।

$$x : y : z : 2x - 3y + 5z$$

$$2 : 3 : 4 : k$$

$$2x - 3y + 5z = k$$

$$4 - 9 + 20 = k$$

$$15 = k$$

Q If $\frac{a}{b} = \frac{2}{3}$ then the value of $(5a^3 - 2a^2b) :$

$(3ab^2 - b^3)$ is:

यदि $\frac{a}{b} = \frac{2}{3}$ तब $(5a^3 - 2a^2b) : (3ab^2 - b^3)$ होगा।

$$\frac{5a^3 - 2a^2b}{3ab^2 - b^3}$$

$$\frac{5 \times 8 - 2 \times 4 \times 3}{3 \times 2 \times 9 - 27}$$

$$\frac{40 - 24}{54 - 27} = \frac{16}{27}$$

Q If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{2}{5}$, then what is $(5a + 3c + 2e) :$

$(5b + 3d + 2f)$?

यदि $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{2}{5}$ है, तो $(5a + 3c + 2e) : (5b + 3d + 2f)$ क्या है?

$$\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{2}{5}$$

$$a = c = e = 2$$

$$b = d = f = 5$$

$$\frac{5a+3c+2e}{5b+3d+2f} = \frac{10+6+4}{25+15+10}$$

$$= \frac{20}{50} = \frac{2}{5}$$

Q If $A:B:C = 2:3:4$, then the ratio $\frac{A}{B}:\frac{B}{C}:\frac{C}{A}$ is equal to

यदि $A:B:C = 2:3:4$ है, तो अनुपात $\frac{A}{B}:\frac{B}{C}:\frac{C}{A}$ बराबर है।

$$\frac{A}{B}:\frac{B}{C}:\frac{C}{A}$$

$$\text{LCM}(3,4,2)=12$$

$$\frac{4}{12} \times \frac{2}{2} : \frac{3}{4} \times \frac{3}{12} : \frac{4}{2} \times \frac{2}{12}$$

$$8:9:24$$

Q If $P:Q = 3:4$ and $Q:R = 4:7$, then find the value of $(P+Q):(Q+R):(R+P)$.

यदि $P:Q = 3:4$ और $Q:R = 4:7$ है, तो $(P+Q):(Q+R):(R+P)$ का मान ज्ञात कीजिए।

$$\begin{array}{c|c} P:Q & Q:R \\ \hline 3:4 & 4:7 \end{array}$$

$$\begin{array}{c} P:Q:R \\ 3:4:7 \end{array}$$

$$\begin{array}{c} P+Q, Q+R: R+P \\ 7, 11, 10 \end{array}$$

Q If $P:Q = 10:11$ and $Q:R = 11:12$ then $(P+Q):(Q+R):(R+P)$ is -

यदि $P:Q = 10:11$ और $Q:R = 11:12$ है तो $(P+Q):(Q+R):(R+P)$ क्या है।

$$\begin{array}{c|c} P : Q & Q : R \\ 10 : 11 & 11 : 12 \end{array}$$

$$P : Q : R$$

$$10 : 11 : 12$$

$$P+Q : Q+R : R+P$$

$$21 : 23 : 22$$

1. If $x : y = 5 : 8$, then what $(4x - 3y) : (4x - 7y)$?

यदि $x : y = 5 : 8$, है तब $(4x - 3y) : (4x - 7y)$?

- (a) 1:9
(b) 1:1
(c) 11:19
(d) 9:1

2. If $x : y = 4 : 5$, then what will be the value of $(8x - 6y) : (9x - 7y)$

यदि $x : y = 4 : 5$ है, तो $(8x - 6y) : (9x - 7y)$ का मान क्या होगा?

- (a) 1:2
(b) 2:3
(c) 2:1
(d) 1:3

3. If $\frac{a}{b} = \frac{2}{3}$ then the value of $(5a^3 - 2a^2b) : (3ab^2 - b^3)$ is:

यदि $\frac{a}{b} = \frac{2}{3}$ तब $(5a^3 - 2a^2b) : (3ab^2 - b^3)$ होगा।

- (a) 16:27
(b) 32:29
(c) 34: 19
(d) 27:16

4. If $3x = 2k$ and $5y = 8k$ then $x : y$.

यदि $3x = 2k$ तथा $5y = 8k$ तो $x : y$ है.

- (1) 5: 12
(2) 5:8
(3) 12:5
(4) 8:5

5. If $\frac{x}{5} = \frac{y}{8}$ then $(x + 5) : (y + 8)$ is equal to-

यदि $\frac{x}{5} = \frac{y}{8}$ तो $(x + 5) : (y + 8)$ बराबर है-

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

6. If $A = \frac{4}{5}$ of B and $B = \frac{5}{2}$ of C , then the ratio of $A : C$ will be.

यदि $A = B$ का $\frac{4}{5}$ तथा $B = C$ का $\frac{5}{2}$ हो, तो $A : C$ का अनुपात होगा।

- (1) 1:2
(2) 2:1

(3) 2:3

(4) 1:3

7. If $L : M : N$ is $5 : 7 : 9$, $M = 63$, $N - L = ?$

यदि $L : M : N$, $5 : 7 : 9$ है, $M = 63$, $N - L = ?$

- (A) 28
(B) 30
(C) 36
(D) 42

8. If $x : y = 4 : 3$, then find the value of $x^3 - y^3 : + x^3 + y^3$.

यदि $x : y = 4 : 3$ है, तो $x^3 - y^3 : + x^3 + y^3$ का मान ज्ञात कीजिए।

- (1) 36: 91
(2) 38: 91
(3) 39: 91
(4) 37: 91

9. If $(x : y) = 2 : 1$ then, $(x^2 - y^2) : (x^2 + y^2)$ is:

यदि $(x : y) = 2 : 1$ है तो, $(x^2 - y^2) : (x^2 + y^2)$ है:

- (1) 3:5
(2) 5:3
(3) 1:3
(4) 3:1

10. If $x^2 : y^2 = 16 : 25$, then what is the value of $\frac{3x+4y}{3x-2y}$.

यदि $x^2 : y^2 = 16 : 25$ है तो $\frac{3x+4y}{3x-2y}$ का मान ज्ञात करें।

- (1) 12
(2) 20
(3) 16
(4) 25

ANSWER SHEET

1	2	3	4	5	6	7	8	9	10
A	C	A	A	D	B	C	D	A	C

Sol. 1

$$x:y = 5:8$$

$$\text{or } (4x-3y):(4x-7y)$$

$$(4 \times 5 - 3 \times 8):(4 \times 5 - 7 \times 8)$$

$$(20 - 24):(20 - 56)$$

$$-4:-36$$

$$\boxed{1:9}$$

Sol. 4

$$3x = 2k \quad \text{or } 5y = 8k$$

$$x:y = ?$$

$$\frac{x}{k} = \frac{2}{3} \quad \frac{y}{k} = \frac{8}{5}$$

$$\begin{array}{r|l} x & k & y \\ \hline 2 & 3 & 8 \\ 5 & 5 & 8 \\ \hline 10 & 15 & 24 \end{array}$$

Sol. 2 $x:y = 4:5$

$$\text{or } (8x-6y):(9x-7y)$$

$$(8 \times 4 - 6 \times 5):(9 \times 4 - 7 \times 5)$$

$$(32 - 30):(36 - 35)$$

$$\boxed{2:1}$$

$$x:y = 10:24$$

$$\boxed{x:y = 5:12}$$

Sol. 5

$$\frac{x}{5} = \frac{y}{8}$$

$$\text{or } (x+5):(y+8)$$

$$\boxed{\frac{x}{y} = \frac{5}{8}}$$

$$(5+5):8+8$$

$$10:16$$

$$\boxed{5:8} \rightarrow \frac{5}{8}$$

Sol. 3 $\frac{a}{b} = \frac{2}{3}$

$$\text{or } (5a^3 - 2a^2b):(3ab^2 - b^3)$$

$$\Rightarrow (5 \times 8 - 2 \times 4 \times 3):(3 \times 2 \times 9 - 27)$$

$$(40 - 24):(54 - 27)$$

$$\boxed{16:27}$$

Sol. 6

$$A = B \text{ का } \frac{4}{5} \quad \text{or } B = C \text{ का } \frac{5}{2}$$

$$5A = 4B, \quad 2B = 5C$$

$$\frac{A}{B} = \frac{4}{5}, \quad \frac{B}{C} = \frac{5}{2}$$

$$A:B:C$$

$$4:5$$

$$5:2$$

$$\hline 4:5:2$$

$$\boxed{A:C = 2:1}$$

Sol. 7

$$L:M:N$$
$$5:7:9$$

$$\swarrow \searrow$$
$$9 \rightarrow 63$$

$$\text{Lcm} \rightarrow 9$$

$$L, m, N$$

$$45, 63, 81$$

$$N-L$$

$$81-45 = 36$$

Sol. 8

$$x:y = 4:3$$

$$\text{or } x^3-y^3 : x^3+y^3$$

$$(64-27) : (64+27)$$

$$\Rightarrow 37 : 91$$

Sol. 9

$$x:y = 2:1$$

$$\text{or } (x^2-y^2) : (x^2+y^2)$$

$$(4-1) : (4+1)$$

$$3:5$$

Sol. 10

$$x^2:y^2 = 16:25$$

$$x:y = 4:5$$

$$\Rightarrow \frac{3x+4y}{3x-2y}$$

$$\Rightarrow \frac{12+20}{12-10} = \frac{32}{2}$$

$$\Rightarrow 16$$