

Sampurna Jan 2026

Quantitative Aptitude

DPP: 5

Ratio and Proportion, Indices and Logarithms

Q1 What is the value of $\frac{p+q}{p-q}$ if $\frac{p}{q} = 7$?

- (A) $\frac{2}{3}$ (B) $\frac{4}{3}$
(C) $\frac{2}{6}$ (D) $\frac{7}{8}$

Q2 The mean proportional between $12x^2$ and $27y^2$ is;

- (A) $18xy$ (B) $81xy$
(C) $8xy$ (D) $19.5xy$

Q3 The value of $[\log_{10} (5 \log_{10} 100)]^2$ is

- (A) 1 (B) 2
(C) 10 (D) 25

Q4 If $x = y^a$, $y = z^b$, $z = x^c$, then the value of abc is

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

Q5 $(18)^{3.5} \div (27)^{3.5} \times 6^{3.5} = 2^x$, then the value of x is

- (A) 3.5 (B) 4.5
(C) 6 (D) 7

Q6 If $\log x = \log 5 + 2 \log 3 - \frac{1}{2} \log 25$, then the value of x is

- (A) 8 (B) 9
(C) 10 (D) None of these

Q7 What is the value of

$$\left(\frac{x^b}{x^c}\right)^{b+c-a} \cdot \left(\frac{x^c}{x^a}\right)^{c+a-b} \cdot \left(\frac{x^a}{x^b}\right)^{a+b-c} ?$$

(A) x^{abc}

(B) $x^{(a+b+c)}$

(C) -1

(D) 1

Q8 $\log_4 (x^2 + x) - \log_4 (x + 1) = 2$. Find x .

- (A) 16 (B) 0
(C) -1 (D) None of these

Q9 The ratio of income of A and B is 5 : 4 and their expenditure is 3 : 2. If at the end of year, each saves ₹1600, then the income of A is

- (A) ₹3,400 (B) ₹3,600
(C) ₹4,000 (D) ₹4,400

Q10 The sum of three numbers is 98. If the ratio of the first to second number is 2 : 3 and that of the second to third is 5 : 8, then the second number is

- (A) 20 (B) 30
(C) 48 (D) 58

Q11 The value of $\frac{(243)^{0.13} \times (243)^{0.07}}{(7)^{0.25} \times (49)^{0.075} \times (343)^{0.2}}$ is;

- (A) $\frac{3}{7}$ (B) $\frac{7}{3}$
(C) $1\frac{3}{7}$ (D) $2\frac{2}{7}$

Q12 Find the value of $\log (x^6)$ if $\log x + 2 \log (x^2) + 3 \log (x^3) = 14$.

- (A) 3 (B) 4
(C) 5 (D) 6



Answer Key

Q1 (B)

Q2 (A)

Q3 (A)

Q4 (A)

Q5 (D)

Q6 (B)

Q7 (D)

Q8 (A)

Q9 (C)

Q10 (B)

Q11 (A)

Q12 (D)



Hints & Solutions

Q1 Text Solution:

Given; $\frac{p}{q} = 7$

$$\Rightarrow \frac{p}{q} = \frac{7}{1}$$

Let $p = 7x$ & $q = x$, then

$$\frac{p+q}{p-q} = \frac{7x+x}{7x-x}$$

$$\Rightarrow \frac{p+q}{p-q} = \frac{8x}{6x}$$

$$\Rightarrow \frac{p+q}{p-q} = \frac{8}{6} = \frac{4}{3}$$

Q2 Text Solution:

Let the mean proportional between

$12x^2$ & $27y^2$ be 'b', then

$$b^2 = 12x^2 \times 27y^2$$

$$\Rightarrow b^2 = 324x^2y^2$$

$$\Rightarrow b = \sqrt{324x^2y^2}$$

$$\Rightarrow b = 18xy$$

Q3 Text Solution:

$$[\log_{10} (5 \log_{10} 100)]^2$$

$$= [\log_{10} (5 \log_{10} 10^2)]^2$$

$$= [\log_{10} (5 \times 2 \log_{10} 10)]^2$$

$$= [\log_{10} (5 \times 2(1))]^2$$

$$= [\log_{10} (10)]^2$$

$$= (1)^2$$

$$= 1$$

Q4 Text Solution:

Given; $x = y^a$, $y = z^b$, $z = x^c$

$$\Rightarrow x = y^a \text{ \& } y = z^b$$

$$\Rightarrow x = (z^b)^a$$

$$\Rightarrow x = z^{ab}$$

Also, $z = x^c$

$$\Rightarrow x = (x^c)^{ab}$$

$$\Rightarrow x = x^{abc}$$

$$\Rightarrow abc = 1$$

Q5 Text Solution:

$$(18)^{3.5} \div (27)^{3.5} \times 6^{3.5} = 2^x$$

$$\Rightarrow \frac{(18)^{3.5}}{(27)^{3.5}} \times 6^{3.5} = 2^x$$

$$\Rightarrow \left(\frac{18 \times 6}{27}\right)^{3.5} = 2^x$$

$$\Rightarrow (4)^{3.5} = 2^x$$

$$\Rightarrow (2^2)^{3.5} = 2^x$$

$$\Rightarrow (2)^7 = 2^x$$

$$\Rightarrow x = 7$$

Therefore, the value of x is 7.

Q6 Text Solution:

Given;

$$\log x = \log 5 + 2 \log 3 - \frac{1}{2} \log 25$$

$$\Rightarrow \log x = \log 5 + \log 3^2 - \log (25)^{\frac{1}{2}}$$

$$\Rightarrow \log x = \log 5 + \log 9 - \log 5$$

$$\Rightarrow \log x = \log 9$$

$$\Rightarrow x = 9$$

Q7 Text Solution:

$$\left(\frac{x^b}{x^c}\right)^{b+c-a} \cdot \left(\frac{x^c}{x^a}\right)^{c+a-b} \cdot \left(\frac{x^a}{x^b}\right)^{a+b-c}$$

$$= (x^{b-c})^{b+c-a} \cdot (x^{c-a})^{c+a-b} \cdot (x^{a-b})^{a+b-c}$$

$$= x^{b^2-bc-ab-bc-c^2+ac+c^2+ac-bc-ac-a^2+ab-ac-ab-b^2+bc}$$

$$= x^0$$

$$= 1$$

'or' Cyclic order trick

Since,

$$(b-c)(b+c-a) + (c-a)(c+a-b)$$

$$+ (a-b)(a+b-c) = 0$$

Thus,

$$\left(\frac{x^b}{x^c}\right)^{b+c-a} \cdot \left(\frac{x^c}{x^a}\right)^{c+a-b} \cdot \left(\frac{x^a}{x^b}\right)^{a+b-c} = x^0 = 1$$

Q8 Text Solution:

Given;

$$\log_4 (x^2 + x) - \log_4 (x + 1) = 2$$

$$\Rightarrow \log_4 \frac{(x^2+x)}{(x+1)} = 2$$

$$\Rightarrow \log_4 \frac{x(x+1)}{x+1} = 2$$

$$\Rightarrow \log_4 x = 2$$

$$\Rightarrow x = 4^2$$

$$\Rightarrow x = 16$$



Q9 Text Solution:

Let the income of A and B be $5x$ and $4x$ respectively.

We know,

Expenditure = Income - Savings

According to question, we have

$$\frac{5x-1600}{4x-1600} = \frac{3}{2}$$

$$\Rightarrow 2(5x - 1600) = 3(4x - 1600)$$

$$\Rightarrow 10x - 3200 = 12x - 4800$$

$$\Rightarrow 12x - 10x = 4800 - 3200$$

$$\Rightarrow 2x = 1600$$

$$\Rightarrow x = 800$$

Therefore, the income of A will be

$$5(800) = ₹4000.$$

Q10 Text Solution:

Let the numbers be x , y and z .

According to question, we have

$$x : y = 2 : 3 \text{ \& } y : z = 5 : 8$$

$$\Rightarrow \frac{x}{y} = \frac{2}{3} \times \frac{5}{5} \text{ \& } \frac{y}{z} = \frac{5}{8} \times \frac{3}{3}$$

$$\Rightarrow \frac{x}{y} = \frac{10}{15} \text{ \& } \frac{y}{z} = \frac{15}{24}$$

$$\Rightarrow x : y : z = 10 : 15 : 24$$

$$\text{Sum of the ratios} = 10 + 15 + 24 = 49$$

$$\text{Therefore, the second number} = \frac{15}{49} \times 98 = 30$$

Q11 Text Solution:

$$\begin{aligned} & \frac{(243)^{0.13} \times (243)^{0.07}}{(7)^{0.25} \times (49)^{0.075} \times (343)^{0.2}} \\ &= \frac{(3^5)^{0.13} \times (3^5)^{0.07}}{(7)^{0.25} \times (7^2)^{0.075} \times (7^3)^{0.2}} \\ &= \frac{3^{0.65} \times 3^{0.35}}{7^{0.25} \times 7^{0.15} \times 7^{0.6}} \\ &= \frac{3^{0.65+0.35}}{7^{0.25+0.15+0.6}} \\ &= \frac{3}{7} \end{aligned}$$

Q12 Text Solution:

$$\text{Given; } \log x + 2 \log (x^2) + 3 \log (x^3)$$

$$= 14$$

$$\Rightarrow \log x + 2 \times 2 \log (x) + 3 \times 3 \log (x)$$

$$= 14$$

$$\Rightarrow \log x + 4 \log x + 9 \log x = 14$$

$$\Rightarrow 14 \log x = 14$$

$$\Rightarrow \log x = 1$$

$$\text{Therefore, } \log (x^6) = 6 \log x = 6(1) = 6.$$

