

RATIO AND PROPORTION

1. Compare the following ratios.
 - (a) 3 : 5 and 4 : 7
 - (b) 5 : 2 and 8 : 3
2. If $a : b = 3 : 4$ and $b : c = 6 : 5$, find
 - (a) $a : c$
 - (b) $a : b : c$
3. Find the compounded ratio of
 - (a) 5 : 6, 12 : 13 and 26 : 27
 $a + b : a - b$, $(a^2 + b^2) : (a + b)^2$ and $(a^2 - b^2) : (a^4 - b^4)$
4. What number must be added to each of the ratio 3 : 5 to make it 11 : 12?
5. What quantity must be added to each term of the ratio $(p + q) : (p - q)$ to make it equal to $(p + q)^2 : (p - q)^2$?
6. The ages of A and B are in the ratio 5 : 7. Eight years ago, their ages were in the ratio 7 : 13. Find their present ages.
7. If $x : y = 8 : 9$, find the ratio $(7x - 4y) : (3x + 2y)$.
8. If $(4x + 3y) : (6x + 5y) = 11 : 17$, find $x : y$.
If $p = \frac{4xy}{x + y}$, find the value of
9. $\left(\frac{p + 2x}{p - 2x} + \frac{p + 2y}{p - 2y} \right)$.
10. If $\frac{a^3 + 3ab^2}{3a^2b + b^3} = \frac{x^3 + 3xy^2}{3x^2y + y^3}$, show that $\frac{x}{a} = \frac{y}{b}$.
11. If $x = \frac{\sqrt{2a+1} + \sqrt{2a-1}}{\sqrt{2a+1} - \sqrt{2a-1}}$, prove that $x^2 - 4ax + 1 = 0$
12. Solve $\frac{\sqrt{x+7} + \sqrt{x-1}}{\sqrt{x+7} - \sqrt{x-1}} = \frac{2}{1}$
13. If $\frac{x}{b+c-a} = \frac{y}{c+a-b} = \frac{z}{a+b+c}$, show that ratio is equal to $\frac{x+y+z}{a+b+c}$.
14. If a, b, c, d are in continued proportion, prove that
 $a : d :: pa^3 + qb^3 + rc^3 : pb^3qc^3 + rd^3$
15. If $x = \frac{\sqrt{2a+3b} + \sqrt{2a-3b}}{\sqrt{2a+3b} - \sqrt{2a-3b}}$ show that $3bx^2 - 4ax + 3b = 0$
16. If $a = \frac{b+c}{2}$, $c = \frac{a+b}{2}$ and b is the mean proportional between a and c , prove that
 $\frac{1}{a} + \frac{1}{c} = \frac{2}{b}$
16. Find the ratio of a and b from equation $12a^2 + 35b^2 - 43ab = 0$