

1. Solve the equation:  $\log_5 x - 4\log_x 5 + 3 = 0$
2. Find the square root of:  $23 - 4\sqrt{15}$
3. Rationalise:  $\frac{2 + \sqrt{3}}{5 + \sqrt{2} - 2\sqrt{3}}$
4. Given that  $\alpha$  and  $\beta$  are the roots of the equation  $2x^2 - 3x + 4 = 0$ , form an equation whose roots are  $\frac{1}{5\alpha + \beta}$  and  $\frac{1}{5\beta + \alpha}$ .
5. Given that  $x^2 + y^2 = 47xy$ , show that  $\log_a x + \log_a y = 2\log_a \left(\frac{x+y}{7}\right)$ .
6. Solve the equation:  $\sqrt{3-x} + \sqrt{x+2} = \sqrt{x+10}$
7. Solve:  $3x^{\frac{2}{3}} - 5x^{\frac{1}{3}} + 2 = 0$
8. Solve:  $\log_{25} 4x^2 = \log_5 (3-x)$ .