

1. If $x = 5 + 3\sqrt{3}$, find $x^2 + \frac{1}{x^2}$
2. If $a + 8\sqrt{5}b = \frac{8+\sqrt{5}}{8-\sqrt{5}} - \frac{8-\sqrt{5}}{8+\sqrt{5}}$, determine the rational numbers a and b .
3. Evaluate: $\frac{4}{(216)^{-\frac{2}{3}}} + \frac{1}{(256)^{-\frac{3}{4}}} + \frac{2}{(243)^{-\frac{1}{5}}}$
4. Evaluate: $\frac{1}{3}(\sqrt{7})^6 \times (25)^{\frac{3}{2}} \times \left(\frac{1}{5^3}\right)$
5. Express $4.0\overline{35}$ in the form of $\frac{p}{q}$ where p and q are integers and $q \neq 0$.
6. Represent $\sqrt{7}$ on the number line.
7. If $\frac{3+\sqrt{7}}{3-4\sqrt{7}} = a + b\sqrt{7}$, where a and b are rational numbers, find a and b .
8. If $x = 1 - \sqrt{2}$, find $x^2 + \frac{1}{x^2}$
9. Find a and b , if $\frac{2\sqrt{5}+\sqrt{3}}{2\sqrt{5}-\sqrt{3}} + \frac{2\sqrt{5}-\sqrt{3}}{2\sqrt{5}+\sqrt{3}} = a + \sqrt{15}b$
10. Simplify: $(2\sqrt{2} - 5)^2 + (3\sqrt{2} + \sqrt{3})^2 - (\sqrt{2} - 1)^2$