

1. If $x = 2 + \sqrt{3}$, find $x - \frac{1}{x}$ and $x^2 + \frac{1}{x^2}$
2. Simplify: $\frac{4+\sqrt{5}}{4-\sqrt{5}} + \frac{4-\sqrt{5}}{4+\sqrt{5}}$
3. If $x = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $y = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$, find $x^2 + y^2$.
4. Find the value of $\frac{1}{3+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{5}} + \frac{1}{\sqrt{5}+2}$
5. Express $0.\overline{35}$ as a rational number in the form $\frac{p}{q}$, where p and q are integers $q \neq 0$.
6. Evaluate: $\sqrt{5 + 2\sqrt{6}} + \sqrt{8 - 2\sqrt{15}}$
7. If $a = 2 + \sqrt{3}$, find the value of $a + \frac{1}{a}$ and $a^2 + \frac{1}{a^2}$.
8. Rationalise the denominator of $\frac{3\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}}$
9. If $\frac{5-2\sqrt{3}}{7-4\sqrt{3}} = a - b\sqrt{3}$, find a and b .
10. Represent $\sqrt{8}$ on the number line.