

1. If $a = 8 + 3\sqrt{7}$ and $b = \frac{1}{a}$, what will be the value of $a^2 + b^2$?
2. Simplify: $(4\sqrt{3} - 3\sqrt{5})^2$
3. Simplify: $\left(\frac{5^{-1} \times 7^2}{5^2 \times 7^{-4}}\right)^{\frac{7}{2}} \times \left(\frac{5^{-2} \times 7^3}{5^3 \times 7^{-5}}\right)^{-\frac{5}{2}}$
4. Represent $\sqrt{5.8}$ geometrically on the number line.
5. Find the values of a and b if $\frac{2\sqrt{6}-\sqrt{5}}{3\sqrt{5}-2\sqrt{6}} = a + b\sqrt{30}$
6. Simplify: $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}}$
7. If $x = 3 + 2\sqrt{2}$, find the value of $x^2 + \frac{1}{x^2}$
8. Evaluate: $\frac{4}{(2187)^{-\frac{3}{7}}} - \frac{5}{(256)^{-\frac{1}{4}}} + \frac{2}{(1331^2)^{-\frac{1}{3}}}$
9. Show that: $\frac{x^{a(b-c)}}{x^{b(a-c)}} \div \left(\frac{x^b}{x^a}\right)^c = 1$
10. Simplify: $\frac{2+\sqrt{3}}{2-\sqrt{3}} - \frac{2-\sqrt{3}}{2+\sqrt{3}}$