

1. Prove that:  $\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \dots + \frac{1}{\sqrt{8}+3} = 2$
2. Prove that:  $\left(\frac{x^{a^2}}{x^{b^2}}\right)^{\frac{1}{a+b}} \cdot \left(\frac{x^{b^2}}{x^{c^2}}\right)^{\frac{1}{b+c}} \cdot \left(\frac{x^{c^2}}{x^{a^2}}\right)^{\frac{1}{c+a}} = 1$
3. Simplify:  $\left\{5 \left(8^{\frac{1}{3}} + 27^{\frac{1}{3}}\right)^3\right\}^{\frac{1}{4}}$
4. Represent geometrically  $\sqrt{5.6}$  on the number line.
5. If  $x = 3 + 2\sqrt{2}$ , find the value of  $x^2 + \frac{1}{x^2}$
6. If  $\frac{3}{4\sqrt{5}-\sqrt{3}} + \frac{2}{4\sqrt{5}+\sqrt{3}} = a\sqrt{5} + b\sqrt{3}$ , find the values of  $a$  and  $b$ .
7. Find four rational numbers between  $-\frac{2}{3}$  and  $\frac{3}{2}$
8. Evaluate:  $\frac{\sqrt{5}+\sqrt{2}}{\sqrt{5}-\sqrt{2}}$  given that  $\sqrt{10} = 3.162$
9. Find the values of  $a$  and  $b$  if:  $\frac{6+4\sqrt{2}}{6+4\sqrt{2}} = a + b\sqrt{2}$
10. Simplify:  $\sqrt{2}(\sqrt{6} - \sqrt{18}) + \sqrt{3}(\sqrt{27} - \sqrt{6}) + 3\sqrt{2}$