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NUMBER SYSTEM

ASSIGNMENT NO. 12

1. Find the value of a and b, if $\frac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} = a + b\sqrt{6}$
2. If $p = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ and $q = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, find $p^2 + q^2$.
3. Show that: $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = 5$
4. Simplify: $\frac{4\sqrt{3}}{2-\sqrt{2}} - \frac{30}{4\sqrt{3}-3\sqrt{2}} - \frac{3\sqrt{2}}{3+2\sqrt{3}}$
5. If $\sqrt{2} = 1.414$, find the value of $\frac{1}{\sqrt{2}+1}$
6. Find the rational numbers a and b such that $\frac{2+5\sqrt{7}}{2-5\sqrt{7}} = a + \sqrt{7}\, b$
7. Write in the simplest form: $12\sqrt{18} + 6\sqrt{20} - 6\sqrt{147} + 3\sqrt{50}$
8. Find the square root of 4.5 geometrically.
9. If $a + 8\sqrt{5} = \frac{8+\sqrt{5}}{8-\sqrt{5}} + \frac{8-\sqrt{5}}{8+\sqrt{5}}$, find a and b.
10. If $x = 3 + 2\sqrt{2}$, find the value of $x^3 + \frac{1}{x^3}$.