NUMBER SYSTEM

ASSIGNMENT NO. 14

1. If $x = 5$ and $y = 2$, find the value of $(x^y + y^x)^{-1}$ and $(x^x + y^y)^{-1}$
2. Represent $\sqrt{6.3}$ geometrically.
3. If $a = \frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $b = \frac{1}{a}$, find the value of $a^2 + b^2$.
4. If $\frac{9^{n+1} \times \left(3^{-\frac{n}{2}}\right) m^{-2} - 27^n}{(3^m \times 2)^3} = \frac{1}{729}$, prove $m - n = 2$.
5. Simplify by rationalising the denominator of $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \frac{3\sqrt{2}}{3\sqrt{2}+\sqrt{15}}$
6. $\frac{\sqrt{147}}{\sqrt{75}}$ is not a rational number as $\sqrt{147}$ and $\sqrt{75}$ are not rational. State whether it is true or false. Justify the answer.
7. If $a = 2 + \sqrt{3} + \sqrt{5}$ and $b = 3 + \sqrt{3} + \sqrt{5}$, find $(a-2)^2 + (b-3)^2$
8. Simplify: $\left(\frac{81}{16}\right)^{-\frac{3}{4}} \times \left(\frac{25}{9}\right)^{-\frac{3}{2}} \times \left(\frac{2}{5}\right)^{-3}$
9. If $a^x = b, b^y = c$ and $c^z = a$, then prove that $xyz = 1$
10. Find a and b if: $\frac{\sqrt{7}-1}{\sqrt{7}+1} - \frac{\sqrt{7}+1}{\sqrt{7}-1} = a + b\sqrt{7}$