JU CHING CHU SECONDARY SCHOOL ( TUEN MUN )

**F.4 MATHEMATICS TEST**

(*Ch. 0 / 1:* ***Indices, Logarithms & Surds***)

1. Simplify

   (a) $\dfrac{3^{5k+2}}{27^{k}}$ (b) $\dfrac{\log(a^2)+\log(b^4)}{\log(ab^2)}$ , where a, b > 0. (10 %)

2. Solve the following equations without using a calculator

   (a) $5^{x} = \dfrac{1}{\sqrt[4]{125}}$ (b) $\log x + 2\log 4 = \log 48$ (10 %)

3. Simplify the following expressions and express the answers in ***surd form***.

   (a) $9\sqrt{3} - \sqrt{75}$ (b) $\left(\frac{1}{2}\sqrt{2} + \sqrt{3}\right)\left(\frac{1}{2}\sqrt{3} - \sqrt{2}\right)$ (10 %)

4. Rationalize

   $$\frac{1}{2\sqrt{3}-\sqrt{6}}$$ (15 %)

5. Given that log2 = r and log3 = s, express the following in terms of r and s.

   (a) log 18 (10 %)

   (b) log 15 (10 %)

6. $$\begin{cases} 4^{x-y} = 4 \\ 4^{x+y} = 16 \end{cases}$$

   solve for x and y. (15 %)

7. Given that $x^{\frac{1}{2}} - x^{-\frac{1}{2}} = 4$, find the values of

   (a) $x + x^{-1}$ (10 %)

   (b) $x^2 - x^{-2}$ (10 %)

**END OF TEST**