



Subject/Topic: A Maths Prelim P1

Date:

$$\begin{aligned}
 1 \quad \sqrt{125^x} &= \frac{5^{1-x}}{25} &= \frac{\sqrt{3+1}}{\sqrt{3}} \\
 5^{\frac{3}{2}x} &= \frac{5^{1-x}}{5^2} &= \frac{\sqrt{3-1}}{\sqrt{3}} \\
 &= 5^{1-x-2} &= \frac{\sqrt{3+1}}{\sqrt{3-1}} \\
 &= 5^{-x-1} &= \frac{(\sqrt{3+1})(\sqrt{3+1})}{(\sqrt{3-1})(\sqrt{3+1})} \\
 \frac{3}{2}x &= -x-1 &= \frac{3+2\sqrt{3}+1}{3-1} \\
 \frac{5}{2}x &= -1 &= \frac{4+2\sqrt{3}}{2} \\
 x &= -\frac{2}{5} &= 2 + \sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 \sqrt{125^x} &= 125^{\frac{1}{2}x} \\
 &= 125^{-\frac{1}{5}} \\
 &= 5^{-\frac{3}{5}} \\
 &= 0.3807307877 \\
 &\approx 0.381
 \end{aligned}$$

3  $\frac{7x^2-12x+17}{(2x-1)(x^2+4)}$  is a proper fraction with non-factorisable quadratic terms in the denominator

$$\begin{aligned}
 \text{Let } \frac{7x^2-12x+17}{(2x-1)(x^2+4)} &= \frac{A}{2x-1} + \frac{Bx+C}{x^2+4} \\
 &= \frac{A(x^2+4) + (Bx+C)(2x-1)}{(2x-1)(x^2+4)}
 \end{aligned}$$

$$\begin{aligned}
 2(i) \quad \tan C &= \tan(180^\circ - A - B) \text{ (sum } \Delta) \\
 &= \tan[180^\circ - (A+B)] \\
 &= -\tan(A+B) \text{ (supp. } \Delta\text{s/ASTC)}
 \end{aligned}$$

$$7x^2 - 12x + 17 = A(x^2 + 4) + (Bx + C)(2x - 1)$$

$$\begin{aligned}
 \text{Setting } x = \frac{1}{2}, \quad 7\left(\frac{1}{2}\right)^2 - 12\left(\frac{1}{2}\right) + 17 &= A\left[\left(\frac{1}{2}\right)^2 + 4\right] + 0 \\
 \frac{51}{4} &= \frac{17}{4}A \\
 A &= 3
 \end{aligned}$$

$$\begin{aligned}
 (ii) \quad C &= 180^\circ - 45^\circ - 60^\circ \\
 &= 75^\circ
 \end{aligned}$$

$$\begin{aligned}
 \text{Setting } x = 0, \quad 17 &= A(4) + C(-1) \\
 &= 12 - C
 \end{aligned}$$

$$\begin{aligned}
 \tan C &= \tan 75^\circ \\
 &= \tan(45^\circ + 30^\circ) \\
 &= \frac{\tan 45^\circ + \tan 30^\circ}{1 - \tan 45^\circ \tan 30^\circ} \\
 &= \frac{1 + \frac{1}{\sqrt{3}}}{1 - 1 \cdot \frac{1}{\sqrt{3}}} \\
 &= \frac{1 + \frac{1}{\sqrt{3}}}{1 - \frac{1}{\sqrt{3}}}
 \end{aligned}$$

$$C = -5$$

$$\begin{aligned}
 \text{Setting } x = 1, \quad 7 - 12 + 17 &= A(1+4) + (B+C)(2-1) \\
 12 &= 5A + (B+C) \\
 B &= 2
 \end{aligned}$$

$$\text{So, } \frac{7x^2-12x+17}{(2x-1)(x^2+4)} = \frac{3}{2x-1} + \frac{2x-5}{x^2+4}$$

Tuition classes for English, Math (including E Maths & A Maths), Science (including combined science [phy/chem/bio]), Physics, Chemistry, Biology, Social Studies/Geography/History and Principles of Accounts (POA). Secondary 1 to Secondary 4.

