



Subject/Topic: A Maths P2 2018

Date:

1(i) $x^2 + 3x + 5 = 0$

2 $(2 + ax)^6 = 2^6 + \binom{6}{1} 2^{6-1} (ax)^1 + \binom{6}{2} 2^{6-2} (ax)^2 + \dots$
 $= 64 + 192ax + 240a^2x^2 + \dots$

Since the roots are α and β ,

$$\alpha + \beta = -\frac{3}{1}$$

(Terms beyond x^2 are not required here)

$$= -3$$

$$\alpha\beta = \frac{5}{1}$$

$$(1 - 4x)(2 + ax)^6 = (1 - 4x)(64 + 192ax + 240a^2x^2 + \dots)$$

$$= 5$$

$$= 64 + 192ax + 240a^2x^2 - 256x - 768ax^2 + \dots$$

$$= 64 + (192a - 256)x + (240a^2 - 768a)x^2 + \dots$$

$$(\alpha + 1)(\beta + 1) = \alpha\beta + \alpha + \beta + 1$$

$$= 5 + (-3) + 1$$

Since the first three terms in the expansion are $64 - 160x + bx^2$,

$$= 3$$

$$64 + (192a - 256)x + (240a^2 - 768a)x^2 = 64 - 160x + bx^2$$

(ii) For the equation whose roots are $\frac{2}{\alpha+1}$ and $\frac{2}{\beta+1}$,

Equating the coefficients of x , $192a - 256 = -160$

$$192a = 96$$

$$a = \frac{1}{2}$$

$$\begin{aligned} \text{Sum of roots} &= \frac{2}{\alpha+1} + \frac{2}{\beta+1} \\ &= \frac{2(\beta+1) + 2(\alpha+1)}{(\alpha+1)(\beta+1)} \\ &= \frac{2(\alpha+\beta+2)}{(\alpha+1)(\beta+1)} \\ &= \frac{2(-3+2)}{3} \\ &= \frac{2(-1)}{3} \\ &= -\frac{2}{3} \end{aligned}$$

Equating the coefficients of x^2 , $240a^2 - 768a = b$

$$b = 240\left(\frac{1}{2}\right)^2 - 768\left(\frac{1}{2}\right)$$

$$= -324$$

$$\begin{aligned} \text{Product of roots} &= \left(\frac{2}{\alpha+1}\right)\left(\frac{2}{\beta+1}\right) \\ &= \frac{4}{(\alpha+1)(\beta+1)} \\ &= \frac{4}{3} \end{aligned}$$

3 Since $AP = AQ$, $\hat{APQ} = \hat{AQP}$.

Now, $\hat{APB} + \hat{BPQ} = \hat{APQ}$

$$= \hat{AQP}$$

$$= \hat{BCP} + \hat{QPC} \quad (\text{since ext. } \angle \text{ of } \Delta = \text{sum of int. opp. } \angle \text{s})$$

However, $\hat{APB} = \hat{BCP}$ (alt. seg. thm)

So, $\hat{APB} + \hat{BPQ} = \hat{APB} + \hat{QPC}$

$$\hat{BPQ} = \hat{QPC}$$

and therefore, PQ bisects \hat{BPC} .

The quadratic equation is given by

$$x^2 - \left(-\frac{2}{3}x\right) + \frac{4}{3} = 0$$

$$x^2 + \frac{2}{3}x + \frac{4}{3} = 0$$

$$3x^2 + 2x + 4 = 0$$

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.

