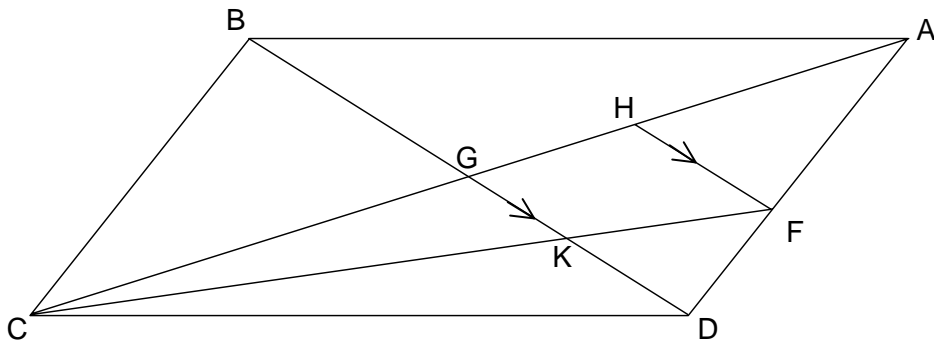


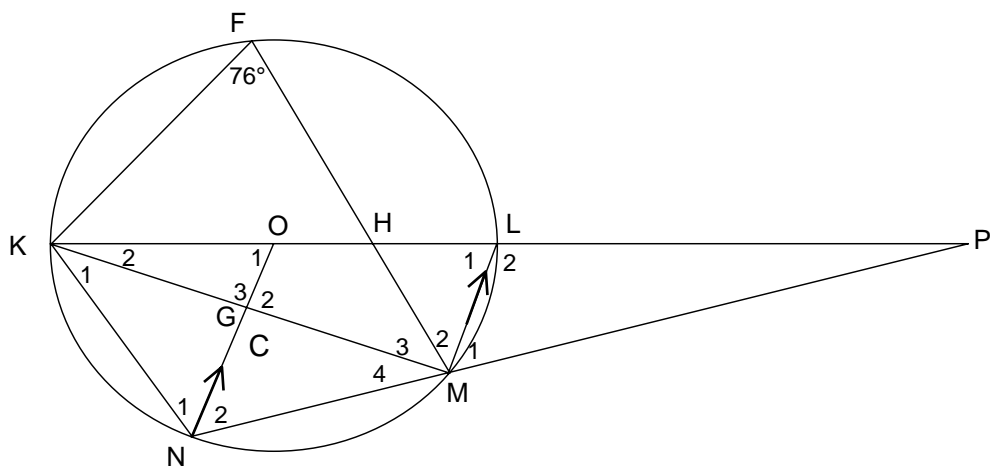
**MATHEMATICS: PAPER III**

**DIAGRAM AND INFORMATION SHEET**

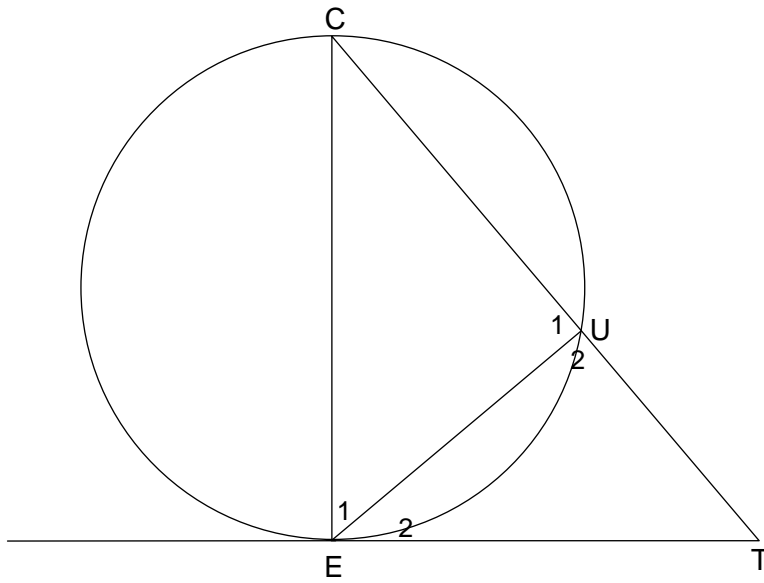
**QUESTION 9**



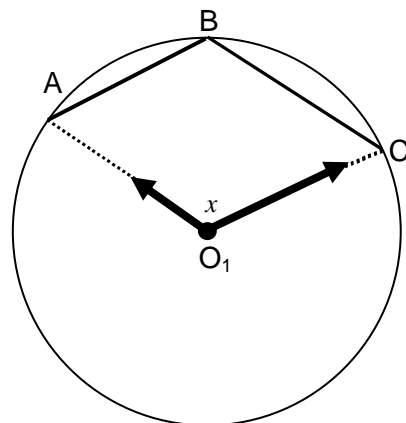
**QUESTION 10**



**QUESTION 11**



**QUESTION 12**



**INFORMATION SHEET**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\sum_{i=1}^n 1 = n$$

$$\sum_{i=1}^n i = \frac{n(n+1)}{2}$$

$$\sum_{i=1}^n [a + (i-1)d] = \frac{n}{2} [2a + (n-1)d]$$

$$\sum_{i=1}^n ar^{i-1} = \frac{a(r^n - 1)}{r - 1}; \quad r \neq 1$$

$$\sum_{i=1}^{\infty} ar^{i-1} = \frac{a}{1-r}; \quad -1 < r < 1, r \neq 0$$

$$T_n = an^2 + bn + c$$

$$T_n = T_1 + (n-1)f + \frac{(n-1)(n-2)}{2} s$$

where  $f$  is the first term of the first difference  
and  $s$  is the second difference

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$A = P(1 + ni)$$

$$A = P(1 - ni)$$

$$A = P(1 + i)^n$$

$$A = P(1 - i)^n$$

$$F = x \left[ \frac{(1+i)^n - 1}{i} \right]$$

$$P = x \left[ \frac{1 - (1+i)^{-n}}{i} \right]$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M \left( \frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2} \right)$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

$$\text{In } \Delta ABC: \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$\text{area } \Delta ABC = \frac{1}{2} ab \cdot \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \cos \alpha \cdot \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \cdot \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta$$

$$\cos 2\alpha = \begin{cases} \cos^2 \alpha - \sin^2 \alpha \\ 1 - 2\sin^2 \alpha \\ 2\cos^2 \alpha - 1 \end{cases}$$

$$\sin 2\alpha = 2\sin \alpha \cdot \cos \alpha$$

$$(x; y) = ((x_A \cos \alpha - y_A \sin \alpha); (y_A \cos \alpha + x_A \sin \alpha))$$

$$\bar{x} = \frac{\sum x}{n}$$

$$\bar{x} = \frac{\sum fx}{n}$$

$$\text{var} = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}$$

$$\text{var} = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$$

$$s.d = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$