

### Question 4

a)  $2^2 - 4 \times 3 \times k < 0$

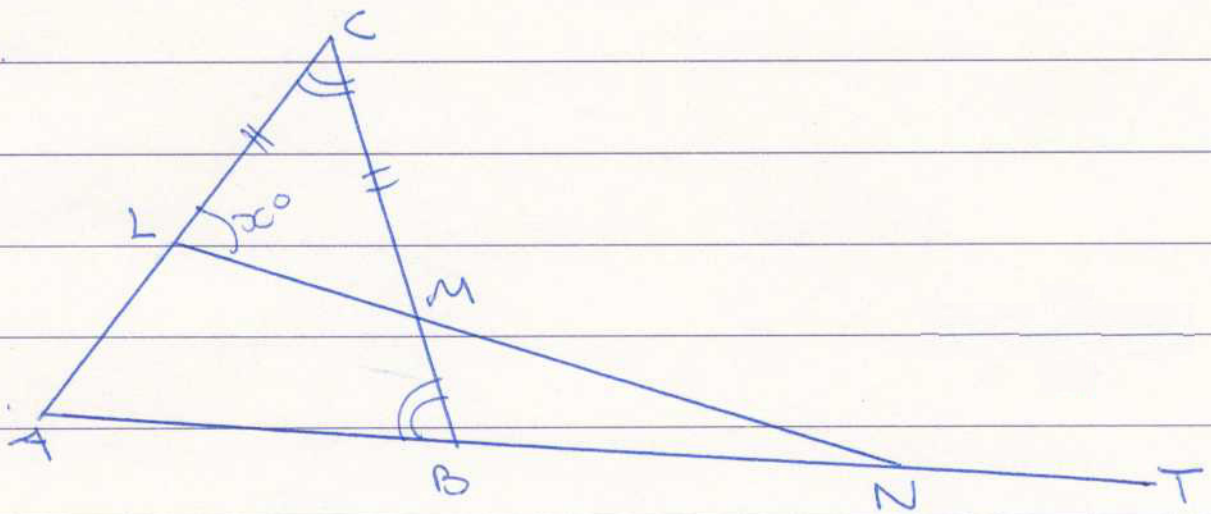
$$4 - 12k < 0$$

$$4 < 12k$$

$$k > \frac{4}{12}$$

$$k > \frac{1}{3}$$

b)



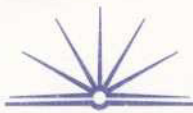
i)  $\angle ABC = \angle ACB$  - given.

$$\angle ACM = 180 - 2x^\circ - \text{property of isosceles } \triangle LCM$$

$$\therefore \angle ABC = 180 - 2x^\circ$$

ii)  $\angle MBN = 180 - (180 - 2x)$  - supplementary to  $\angle ABC$   
 $= 2x^\circ$

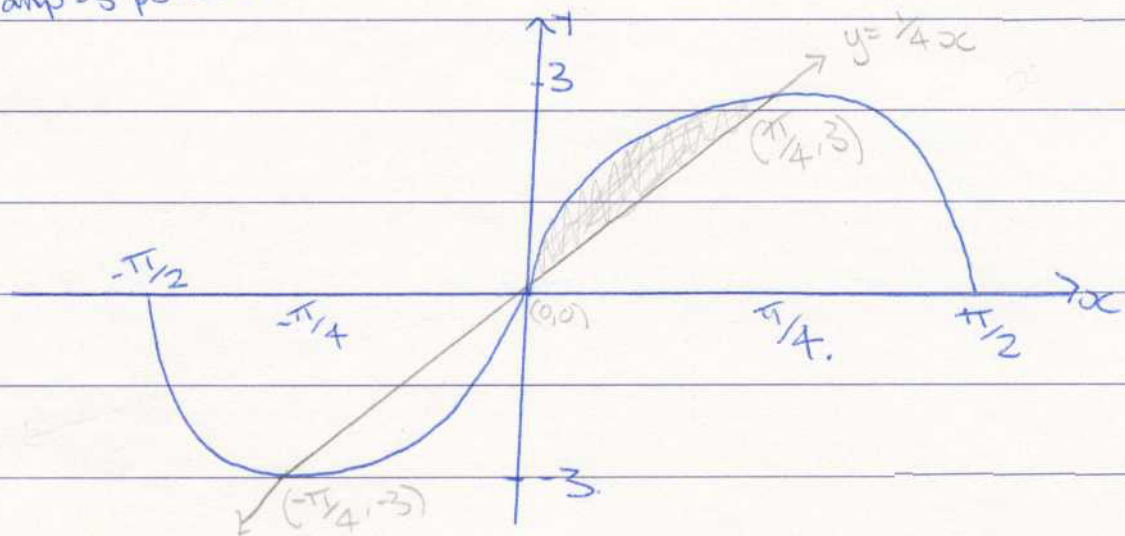
$$\angle BMN = x^\circ - \text{vertically opposite to } \angle LMC$$



$$\widehat{BNM} = 180 - 3x \quad \text{- Angle sum of } \triangle BMN$$

$$\begin{aligned}\widehat{TNL} &= 180 - (180 - 3x) \quad \text{- Supplementary to } \widehat{BNM}, \\ &= 3x\end{aligned}$$

c). amp = 3 period =  $\pi$



$$\begin{aligned}\text{iii)} \quad & \int_{-\pi/4}^{\pi/4} (3 \sin 2x - \frac{1}{4}x) dx \\ &= \left[ -\frac{3}{2} \cos 2x - \frac{x^2}{8} \right]_{-\pi/4}^{\pi/4} \\ &= \frac{8\pi^2}{16} + \frac{1}{2} \\ &= \frac{\pi^2}{2} + \frac{3}{2} \\ &= \frac{3\pi^2}{2} \quad \text{u2}\end{aligned}$$