

$$(a) 3x^2 + 2x + k = 0$$

$$\Delta < 0$$

$$\Delta = B^2 - 4ac$$

$$= 2^2 - 4(3)(k)$$

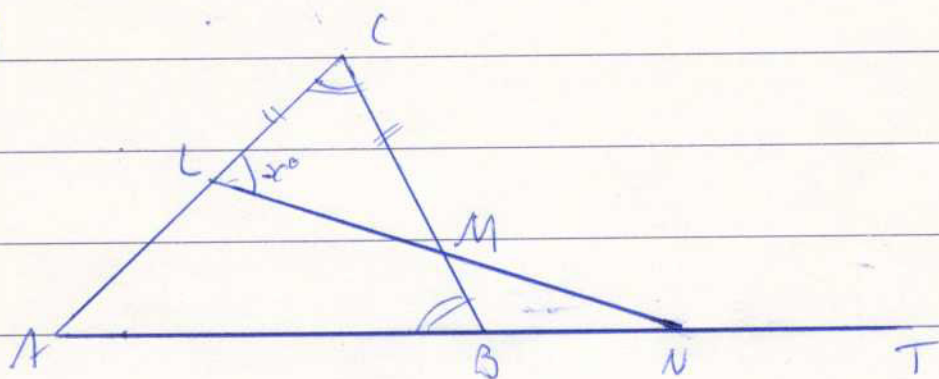
$$= 4 - 12k$$

$$\therefore 4 - 12k < 0$$

$$-12k < -4$$

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

(b)



(i) Prove  $\angle ABC = 180 - 2x^\circ$

- $\angle CLM = \angle CML = x^\circ$  (angles opposite equal sides are also equal)

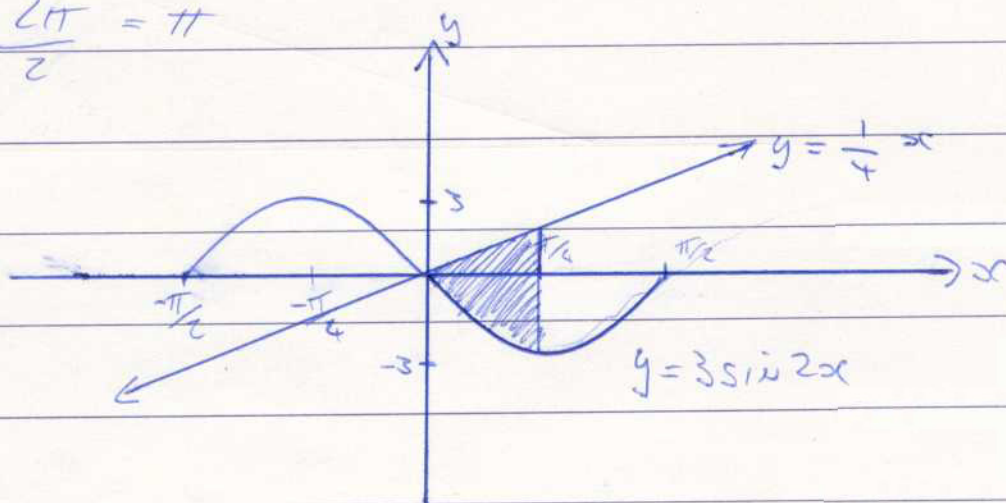


cc) Sketch  $y = 3 \sin 2x$  for  $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$

amplitude = 3

Period =  $\frac{2\pi}{2} = \pi$

(12)



iii)  $y = \frac{x}{4}$

$x$	0	1	2
$y$	0	$\frac{1}{4}$	$\frac{1}{2}$



$$(c) \int_0^{\pi/4} \left( 3 \sin 2x - \frac{1}{4} x \right) dx$$

$$= \left[ \frac{-3 \cos 2x}{2} - \frac{x^2}{8} \right]_0^{\pi/4}$$

$$= \left[ \frac{-3 \cos 2(\pi/4)}{2} - \frac{(\pi/4)^2}{8} \right] - \left[ \frac{-3 \cos 0}{2} \right]$$

$$= \left[ 0 - 253/8 \right] + \left[ 3/2 \right]$$

$$= 251/8$$