BOARD OF STUDIES NEW SOUTH WALES

Question 4.

a. $3x^2 + 2x + k = 0$ has no real roots.

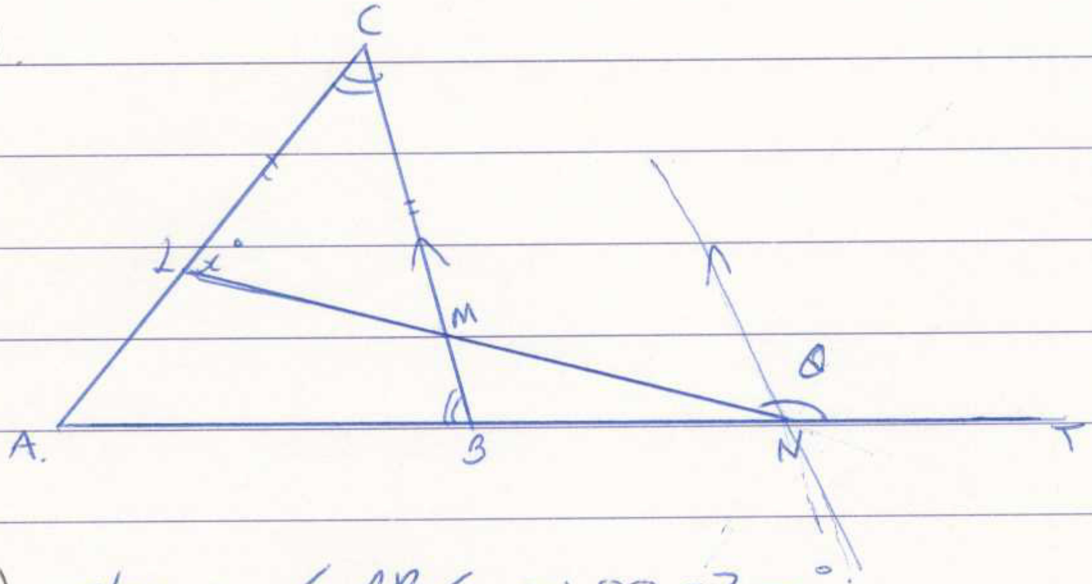
$\Delta = b^2 - 4ac < 0$

$\therefore 4 - 12k < 0$

$12k > 4$

$k > 1/3$

b)



i). show $\angle ABC = 180 - 2x°$.

~~[illegible]~~

Δ CLM is isosceles $\therefore$

$\therefore \angle CLM = \angle CML = x°$.

$\therefore$ both angles $= 2x$.

then 180 (sum of a Δ) $- 2x = \angle LCM$.

$\angle LCM = \angle ABC$

$\therefore \angle ABC = 180 - 2x°$

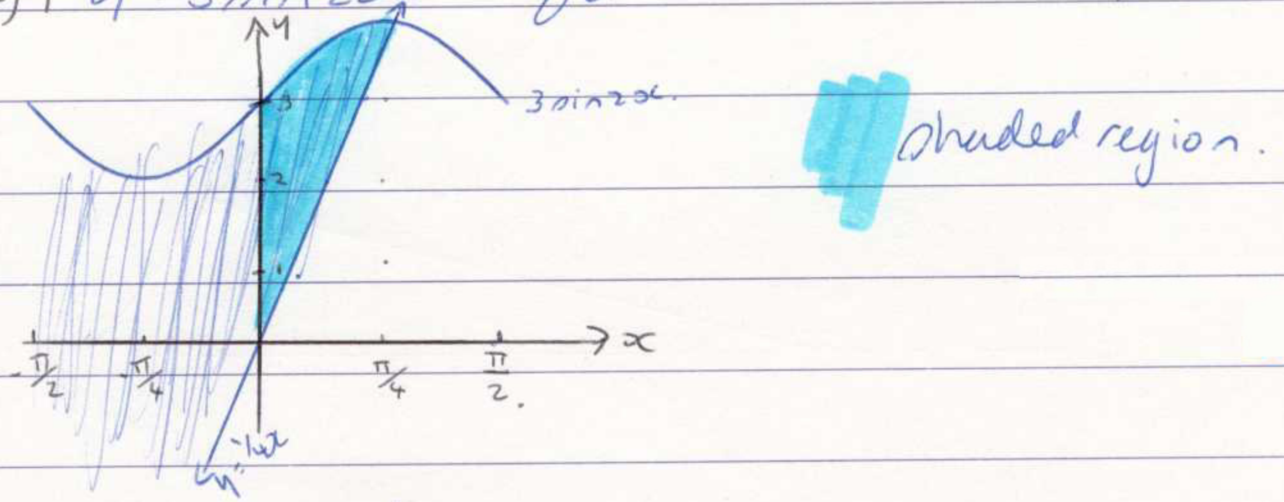
ii show that $\angle TNL$ $3x°$

$x°$ because of //'s alternat angle.

$180 - y = 3x°$ .. because of //'s and alterant angles $\therefore$

$\angle TNL = 3x°$

c) i $y = 3\sin 2x$. for $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$.



ii sketch $y = \frac{1}{4}x$.

$(0,0), (1, \frac{1}{4}), (-1, -\frac{1}{4}), (2, \frac{1}{2}), (-2, -\frac{1}{2})$

$\int_0^{\pi/4} (3\sin 2x - \frac{1}{4}x)\,dx$.

$\left[-\frac{3}{2}\cos 2x - \cancel{\frac{1}{4}x}\right]_0^{\pi/4}$.

iii

$\int_0^{\pi/4} (3\sin 2x - \frac{1}{4}x)\,dx$.

$\left(-\frac{3}{2}\cos 2x - \frac{1}{8}x^2\right)_0^{\pi/4}$

$= \left(-\frac{3}{2} \times 0 - \frac{1}{8}x^2\right) -$

$= \left(\frac{3}{2} - 0\right)$.

$= -\cancel{2.53}\ 1/8 - \frac{3}{2}$

$= -254\ 5/8$