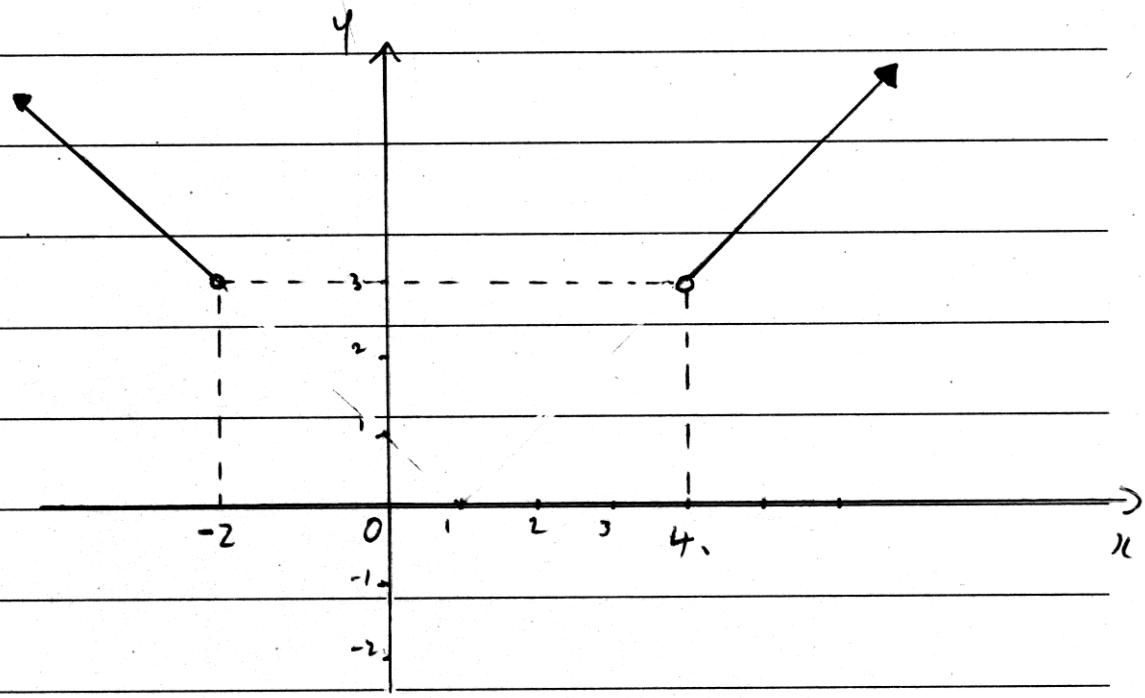
BOARD OF STUDIES
NEW SOUTH WALES

Question 4.

a) $|x-1| \geq 3$

$x-1 \geq 3$

$-x+1 \geq 3$



$x-1 \geq 3$ $\quad -x+1 \geq 3$

$\therefore x \geq 4$ $\quad -x \geq 2$ $\quad \therefore x \leq -2$

b) $\cos\theta - \frac{2}{5} = 0$

$\therefore \cos\theta = \frac{2}{5}$

$\therefore \theta = 66^\circ 25', 293^\circ 35'$

$\therefore \theta = 66^\circ, 294^\circ$

c) $MN^2 = 8.9^2 + 5.2^2 - 2(5.2 \times 8.9)\cos 110^\circ$

$= 106.25 - 92.56\cos 110$

$\therefore MN^2 = 137.8937$

$\therefore MN = 11.74$ (2 d.p).

BOARD OF STUDIES
NEW SOUTH WALES

(ii) $A = \frac{1}{2}bc\sin A$

$= \frac{1}{2} \times 8.9 \times 5.2 \sin 110$

$= \frac{1}{2} \times 46.28 \times 0.939$

~~$\therefore A = 21.7 \ldots m^2$~~

$\therefore A = 21.74\ m^2$

d) (i) $y = 2x$ — (1)

$y = 6x - x^2$ — (2)

sub (1) into (2)

$\therefore 2x = 6x - x^2$

$\therefore x^2 - 4x = 0$

$\therefore x(x-4) = 0$

$\therefore x = 0, 4$

$\therefore y = 0$, or $y = 2(4) = 8$

$\therefore B(4,8)$ as $(0,0)$ is the origin.

(ii) $A = \int_0^4 (6x - x^2)\,dx - \int_0^4 (2x)\,dx$

$= \left[\frac{6x^2}{2} - \frac{x^3}{3}\right]_0^4 - \left[\frac{2x^2}{2}\right]_0^4$

$= \left[3x^2 - \frac{1}{3}x^3\right]_0^4 - \left[x^2\right]_0^4$

$= \left[48 - \frac{64}{3}\right] - 16$

$\therefore A = 48 - \frac{64}{3} - 16 = 10\frac{2}{3}$ units^2