BOARD OF STUDIES
NEW SOUTH WALES

Question 4

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

$(x-1) \geq 3$

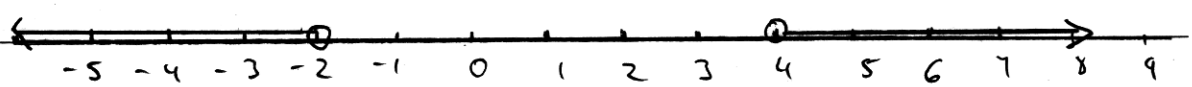
$x \geq 4$

$-(x-1) \geq 3$

$-x+1 \geq 3$

$-x \geq 2$

$x \leq -2$




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

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

$5\cos\theta = 2$

| | |
|---|---|
| S | A ✓ |
| T | C ✓ |

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BOARD OF STUDIES
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c) i) $a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 5.2^2 + 8.9^2 - 2 \times 5.2 \times 8.9 \times \cos 110°$

$a^2 = 27.04 + 79.21 - 92.56 \times \cos 110$

$= 186.25$

$a^2 = 137.907$

$a = 11.7$

$MN = 11.7$

ii)

d) $y = 2x \rightarrow (1)$

$y = 6x - x^2 \rightarrow (2)$

Sub (1) in (2) $\therefore 2x = 6x - x^2$

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

$= 4x - x^2$

$= x(4 - x)$

$= 4x + x^2$

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BOARD OF STUDIES
NEW SOUTH WALES

$0 = x(4-x)$

$0 = 4 - x$

$x = 4$

Sub in original

$y = 2x$

$y = 2(4)$

$y = 8$

$\therefore$ coordinates of B are $(4, 8)$

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

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

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

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

$= \left[\left(26\frac{2}{3}\right) - (0)\right] - \left[16 - 0\right]$

$= 26\frac{2}{3} - 16$

$= 10\frac{2}{3}$ units$^2$