BOARD OF STUDIES
NEW SOUTH WALES

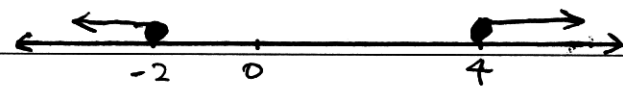
Question 4

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

$x-1 \geq 3$ or $1-x \geq 3$

$x \geq 4$ or $x \leq -2$

$x \geq 4$ or $x \leq -2$



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

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

$\theta = \cos^{-1}\left(\frac{2}{5}\right)$

For $0° \leq \theta \leq 360°$, $\theta = 66°$, [redacted] $294°$

c)i) $MN^2 = 5.2^2 + 8.9^2 - 2 \times 5.2 \times 8.9 \times \cos 110°$ (cosine rule)

$MN^2 = 106.25 - 92.56 \times \cos 110°$

$= 137.90738...$

$\therefore MN = 11.74339...$

$= 11.7$ [redacted] m ([redacted] decimal places)

ii) Area $= \frac{1}{2}ab\sin C$

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

$= 21.7444...$

$= 21.7$ [redacted] m^2 (1 [redacted] decimal places)

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d)i) If (4, 8) substituted into equation $y = 2x$:

LHS = 8

RHS = 2×4

$= 8$

Also, in $y = 6x - x^2$: $8 = 6(4) - 4^2$

$8 = 8$

LHS = RHS

$\therefore$ it follows that point B has co-ords. (4, 8)

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

$= \int_0^4 4x - x^2 \, dx$

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

$= 2(4)^2 - \frac{1}{3}(2)^3 - \left(2(0)^2 - \frac{1}{3}(0)^3\right)$

$= 32 - \frac{8}{3} - 0$

$= 29\frac{1}{3}$ units^2