Question 2

a) $y = x^2 + 3x$

$y = (1)^2 + 3(1)$

$= 4$

$0 = x^2 + 3x$

$x(x+3) = 0$

$x = -3$ or 0

$m = \frac{-b}{a}$

$= \frac{-3}{1}$

$= -3$

$y - 4 = -3(x - 1)$

$y - 4 = -3x + 1$

$y = -3x + 5$

$y + 3x - 5 = 0$

b) i) $m = \frac{3-5}{4+2}$

$= \frac{-2}{6}$

$= -\frac{1}{3}$

$y - 5 = -\frac{1}{3}(x + 2)$

$3(y - 5) = -1(x + 2)$

$3y - 15 = -x - 2$

$x + 3y - 13 = 0$

ii) $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$AB = \sqrt{(4+2)^2 + (3-5)^2}$

$= \sqrt{36 + 4}$

$= \sqrt{40}$

$= 2\sqrt{10}$

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iii) $\left|\frac{ax_1+by_1+c}{\sqrt{a^2+b^2}}\right|$

$O = (0,0)$

$AB = x+3y-13$

$d = \left|\frac{1(0)+3(0)-13}{\sqrt{1^2+3^2}}\right|$

$= \frac{-13}{\sqrt{10}}$

$= 4.11$

iv) $OABC = \frac{1}{2} \times 4.11 \times 2\sqrt{10}$

$= 13 \text{ units}^2$

v) ~~$AO = \sqrt{(0+2)^2+(0-5)^2}$~~

~~$= \sqrt{4+25}$~~

~~$= \sqrt{29}$~~

~~$\sqrt{29} = \sqrt{(x-4)^2+(y-3)^2}$~~

~~$= \sqrt{(x^2-16)+(y^2-9)}$~~