THE LINE (Q 2, PAPER 2)

2008 2 (a) Find the area of the triangle with vertices (0, 0), (8, 6) and (-2, 4). (b) *L* is the line y - 6 = -2(x + 1). (i) Write down the slope of L. (ii) Verify that p(1, 2) is a point on L. (iii) L intersects the y-axis at t. Find the co-ordinates of t. (iv) Show the line L on a co-ordinate diagram. (c) o(0, 0), a(5, 2), b(1, 7) and c(-4, 5) are the vertices of a parallelogram. (i) Verify that the diagonals [*ob*] and [*ac*] bisect each other. (ii) Find the equation of *ob*. **SOLUTION** 2 (a) (8, 6) (-2, 4) $A = \frac{1}{2} |x_1 y_2 - x_2 y_1| \qquad 6$ $\downarrow \downarrow$ $\downarrow \downarrow$ $x_1 y_1 \qquad x_2 y_2$ $A = \frac{1}{2} \left| x_1 y_2 - x_2 y_1 \right|$ $\Rightarrow A = \frac{1}{2} |(8)(4) - (-2)(6)| = \frac{1}{2} |32 + 12|$ $\therefore A = \frac{1}{2} |44| = 22 \text{ units}^2$ 2 (b) (i) GENERAL FORM OF A STRAIGHT LINE L: y-6 = -2(x+1)Every straight line can be written in the form: ax + by + c = 0. $\Rightarrow y-6 = -2x-2$ You can read off the slope of a straight line from its equation. $\therefore L: 2x + y - 4 = 0$ Slope: $m = -\left(\frac{a}{b}\right)$ Slope: $m = -\frac{2}{1} = -2$ $\frac{\text{Number in front of } x}{\text{Number in front of } y}$ **Remember it as:** Slope m = -2 (b) (ii) IS A POINT ON A LINE? $p(1, 2) \in L?$ To show a point is on a line, put the point into the equation. 2(1) + (2) - 4 = 2 + 2 - 4 = 0 $\therefore p(1, 2) \in L$

2 (b) (iii)

To find the *x*-intercept: Put y = 0. To find the *y*-intercept: Put x = 0.

Put x = 0: $\Rightarrow 2(0) + y - 4 = 0 \Rightarrow y - 4 = 0$

 $\therefore y = 4$

 $\therefore t(0, 4)$ is the *y*-intercept.

2 (b) (iv)

You need 2 points to draw a straight line. Use p(1, 2) and t(0, 4).



2 (c) (i)

If two line segments bisect each other (cut each other in half) they share the same midpoint. If you can show they have the same midpoint they bisect each other.

