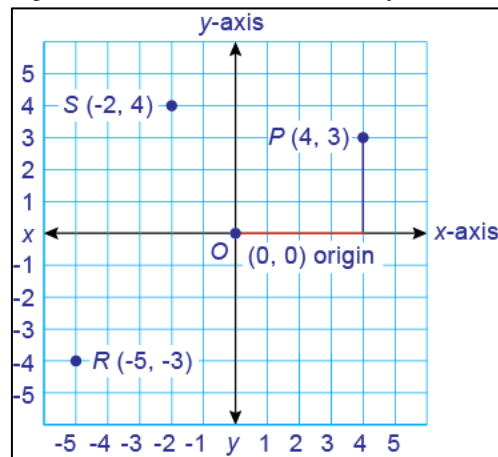


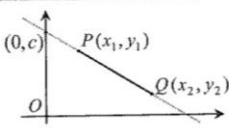
NICKS & TRICKS

LCOL Guide to – Co-Ordinate Geometry

1. Co-Ordinate Geometry is all about lines, points and graphs like this:



2. Don't forget page 18/19 of your log tables!

Céimseata chomhordanáideach	Co-ordinate geometry
Líne	Line
	
fána PQ	$m = \frac{y_2 - y_1}{x_2 - x_1}$ slope of PQ
fad $[PQ]$	$ PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ length of $[PQ]$
lárphointe $[PQ]$	$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$ midpoint of $[PQ]$
cothromóid PQ	$y - y_1 = m(x - x_1)$ $y = mx + c$ equation of PQ
achar an triantáin OPQ	$\frac{1}{2} x_1y_2 - x_2y_1 $ area of triangle OPQ
pointe a roinneam $[PQ]$ sa chóimheas $a : b$	$\left(\frac{bx_1 + ax_2}{b + a}, \frac{by_1 + ay_2}{b + a} \right)$ point dividing $[PQ]$ in the ratio $a : b$
- 18 -	

Worked Example

(i) A line n passes through the points $A (-1,2)$ and $B (0,-2)$. Write the equation of n in the form $y = mx + c$, where $m, c \in \mathbb{Z}$.

Don't forget the equation of a line! $y - y_1 = m(x - x_1)$

Here we have: $m = -4, y_1 = 2, x_1 = -1$

Slope

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\begin{matrix} A(-1, 2) & B(0, -2) \\ (x_1, y_1) & (x_2, y_2) \end{matrix}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{-2 - 2}{0 - (-1)}$$

$$m = \frac{-4}{1}$$

$$m = -4$$

$$y - y_1 = m(x - x_1)$$

$$y - 2 = -4(x - (-1))$$

$$y - 2 = -4(x + 1)$$

$$y - 2 = -4x - 4$$

$$y = -4x - 4 + 2$$

$$y = -4x - 2$$

(ii) The diagram below shows the line $l : 3x - 4y = 5$ and the point $P(6, -3)$. Find the equation of the line k through the point P that is perpendicular to the line l . Write your answer in the form $ax + by + c = 0$, where $a, b, c \in \mathbb{Z}$.

First lets find the slope of the line, remember to find the slope of a **perpendicular** line we invert it and change the sign! Then we fill in the **slope we have found** and the **point from the question** to find our line.

Equation of a Line

$$y = mx + c$$

Where m is the slope.

$$3x - 4y = 5$$

$$-4y = -3x + 5$$

$$4y = 3x - 5$$

$$y = \frac{3}{4}x - \frac{5}{4}$$

$$m = \frac{3}{4}$$

We can find a perpendicular slope by inverting and changing the sign.

$$\frac{3}{4} \perp -\frac{4}{3}$$

$$m = -\frac{4}{3}$$

$$m = -\frac{4}{3}$$

$$(x_1, y_1) = P(6, -3)$$

Equation of a Line

$$y - y_1 = m(x - x_1)$$

$$y - y_1 = m(x - x_1)$$

$$y - (-3) = -\frac{4}{3}(x - 6)$$

$$3(y + 3) = -4(x - 6)$$

$$3y + 9 = -4x + 24$$

$$4x + 3y + 9 - 24 = 0$$

$$4x + 3y - 15 = 0$$

2019 Question – 12 mins – Time yourself!

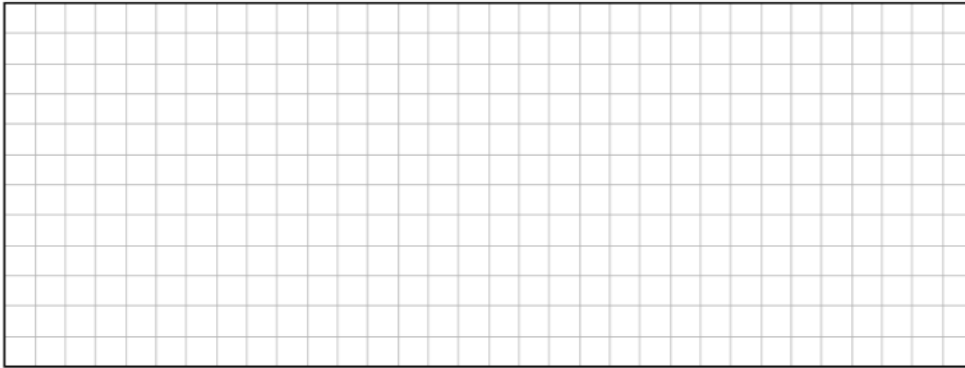
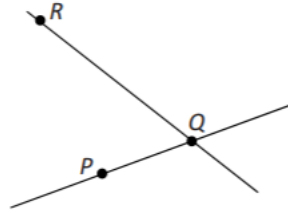
Question 2

(25 marks)

The diagram shows the line PQ and the line QR .

The co-ordinates of the points are $P(4, 2)$, $Q(8, 5)$ and $R(2, 11)$.

- (a) Find the slope of PQ .



- (b) Find the equation of the line PQ .

Give your answer in the form $ax + by + c = 0$, where $a, b, c \in \mathbb{Z}$.



(c) Write down the slope of any line perpendicular to PQ .

Slope =

(d) Find the area of the triangle PQR .

