



NICKS & TRICKS

LUKE'S GUIDE TO JUNIOR CERT HL MATHS

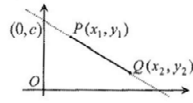
Topic 5 – Co-Ordinate Geometry

This is a **Paper 2** topic. **Co-Ordinate Geometry** is everything to do with **lines**, **graphs**, and **coordinates** like those we would have looked at in Functions. The **Log Tables** are vital for this section and **most questions will just be a formula straight from page 18!** Learn the nicks & tricks below to help you find any slope, equation, or distance on a graph!

- (i) Page 18 Log Tables
- (ii) Slope
- (iii) Equation of a Line
- (iv) Distance
- (v) Line Cutting Axes
- (vi) Point of Intersection

(i) PAGE 18 LOG TABLES

Céimseata chomhordanáideach	Co-ordinate geometry
Líne	Line
fána PQ	slope of PQ
fad $[PQ]$	length of $[PQ]$
lárphointe $[PQ]$	midpoint of $[PQ]$
cothromóid PQ	equation of PQ
achar an triantáin OPQ	area of triangle OPQ
pointe a roinneann $[PQ]$ sa chóimheas $a : b$	point dividing $[PQ]$ in the ratio $a : b$



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

$$|PQ| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \star$$

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \star$$

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

$$y = mx + c$$

$$\frac{1}{2} |x_1 y_2 - x_2 y_1|$$

$$\left(\frac{bx_1 + ax_2}{b+a}, \frac{by_1 + ay_2}{b+a} \right)$$

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Page 18 of the Log Tables is the **most important part of this topic!** I can't say that enough. A lot of Co-Ordinate Geometry questions on your exam will just be using a formula from this page!

When using any formula on this page, label one point (x_1, y_1) and the other point (x_2, y_2) . **It does not matter which point you call (x_1, y_1) and which you call (x_2, y_2) .**

Read the right-hand column to see what each formula is for! Focus on the formulas that I've put a star next to!

(ii) SLOPE

2 DIFFERENT SCENARIOS
They want you to find the slope of a line using...

Its equation:

Make sure x and y are on same side of equals sign and then:

$$\text{Slope} = \frac{-\text{Number in front of } x}{\text{Number in front of } y}$$

Not in Log Tables

$$3x - 4y + 7 = 0$$

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

2 Points:

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

Log Tables Page 18

Points (2,5) and (4,7)

↑ ↑
 (x_1, y_1) (x_2, y_2)

$$m = \frac{7 - 5}{4 - 2} = \frac{2}{2} = 1$$

(iii) EQUATION OF A LINE

There are 2 formulas in the Log Tables Page 18 that say "Equation". When a question asks you to find the equation of a line...

USE $y - y_1 = m(x - x_1)$ ✓ IGNORE $y = mx + c$ ✗

As you can see from the correct formula, **to get the equation of a line all you need is its slope and any point on the line!** Get the slope first and then sub the slope and any point on the line into the formula to get its equation!

Example: Find equation of line that connects

$$m = \frac{6 - 0}{5 - 2} = \frac{6}{3} = 2$$

$$y - 6 = 2(x - 5)$$

$$y - 6 = 2x - 10$$

$$2x - y - 4 = 0$$

Step 1. Find slope.

Step 2. Sub in slope and any point into equation of line formula from page 18 Log Tables.

Step 3. Multiply out brackets and simplify

the points (2,0) and (5,6)

(iv) DISTANCE

To find the distance between 2 points, we use the formula:

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

Straight out of page 18 Log Tables once again!

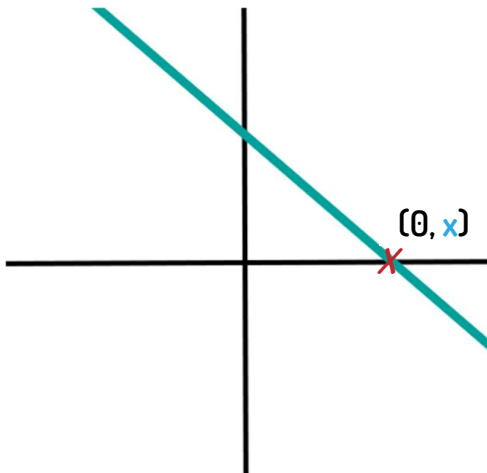
NOTE: This is the exact same thing as finding the length of a line!

(v) LINE CUTTING AXES

To find where a line...

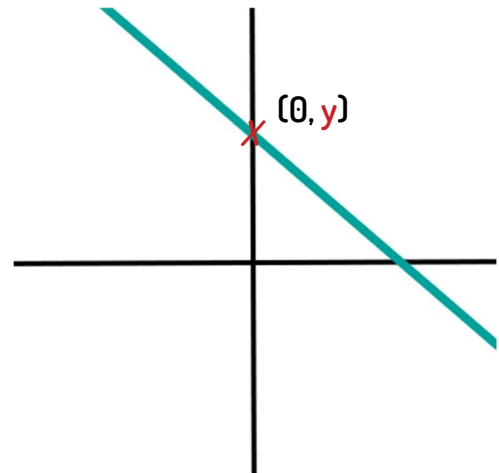
Cuts the x-axis

Sub 0 in for y into equation of the line and solve for x !
Point where line crosses x-axis is $(0, x)$



Cuts the y-axis

Sub 0 in for x into equation of the line and solve for y !
Point where line crosses y-axis is $(0, y)$



(vi) POINT OF INTERSECTION

To find the point of intersection of 2 lines, just do simultaneous equations with their equations! Remember simultaneous equations from algebra?

Example:

$$2y + 3x = 5 \quad \text{Line 1}$$

$$y + 5x = 6 \quad \text{Line 2}$$



$$2y + 3x = 5 \quad \text{Line 1}$$

$$\underline{-2y - 10x = -12} \quad \text{Line 2} \times -2$$

$$-7x = -7$$

$$x = 1$$

$$y + 5(1) = 6 \quad \text{Line 2 subbing } x \text{ in}$$

$$y = 1$$

(1,1) is point of intersection!

LUKE'S EXAM PREDICTIONS

- **Equation of a Line** has come up 4 out of the past 5 years!
 - **Slope** has come up 3 out of the past 5 years!
 - **Distance** has come up 3 out of the past 5 years!
 - **Point of Intersection** has come up 3 out of the past 5 years!
 - **Line Cutting Axes** has come up 2 out of the past 5 years!
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Co-Ordinate Geometry is a great topic to study as a lot of it is just using the Log Tables! Study this guide and use your Log Tables and this section will be free marks for you in your exam!

“How do you eat an elephant? One bite at a time!”