**Coordinate Geometry:
The Line**

chapter **1**

Section 1.4 Dividing a line in a given ratio

PROJECT MATHS – STRAND 2
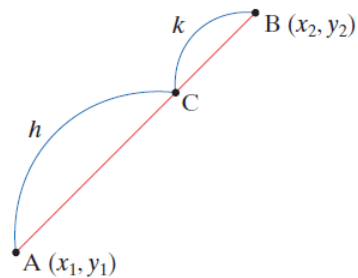**Text & Tests 4**
LEAVING CERTIFICATE
HIGHER LEVEL

17

Internal division

In the given diagram, the point C divides
the line segment [AB] in the ratio $h:k$.
The coordinates of C are given by the formula,

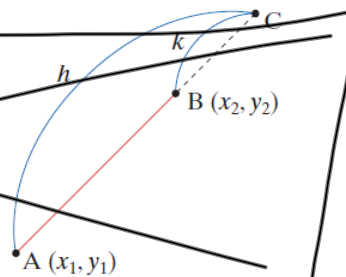$$C = \left(\frac{hx_2 + kx_1}{h + k}, \frac{hy_2 + ky_1}{h + k} \right)$$ **Internal divisor**

External division

In the given diagram, the point C
divides the line segment [AB] **externally** in the ratio $h:k$.
The coordinates of C are given by the formula,

$$C = \left(\frac{hx_2 - kx_1}{h - k}, \frac{hy_2 - ky_1}{h - k} \right)$$ **External divisor**

not on course

Example 1

Find the coordinates of the point which divides the line segment
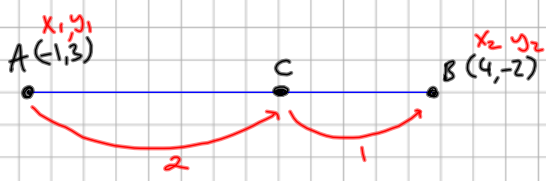A$(-1, 3)$ and B$(4, -2)$
(i) internally   ~~(ii) externally~~ in the ratio $2:1$.

$$C = \left(\frac{hx_2 + kx_1}{h + k}, \frac{hy_2 + ky_1}{h + k} \right)$$

Ratio $2:1$
$h:k$

$h + k = 3$

$$A \overset{x_1, y_1}{(-1,3)} \qquad C \qquad B \overset{x_2 \ y_2}{(4,-2)}$$

2 $\qquad$ 1

$$C = \left(\frac{2\,(4) + 1\,(-1)}{3}, \frac{2\,(-2) + 1\,(3)}{3} \right)$$

$$= \left(\frac{7}{3}, \frac{-1}{3} \right)$$