

# Assignment 1

Anjali Bagade, EE21MTECH11001

## vector

**Abstract**—This document contains the solution to find Internally and externally divided coordinate points.

Download all python codes from

<https://github.com/Anjalibagade/EE5600/tree/master/Assignment1>

and latex codes from

<https://github.com/Anjalibagade/EE5600/Assignment1>

## Problem

### Vector-2, Example-1, Question-18

Find the coordinates of the point which divides, internally and externally, the line joining  $(-3, -4)$  to  $(-8, 7)$  in the ratio  $7:5$

### Solution:

Let us consider  $S$  and  $T$  are Vectors which divides  $A$  and  $B$  in the ratio of  $7:5$  gives internally and externally divided points respectively.

#### 1) Finding internal coordinate point :

The coordinates of point  $S$  which divides the line joining  $A$  and  $B$  internally in the ratio  $m:n$  is given by the section formula

$$S = \left( \frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n} \right) \quad (0.0.1)$$

Substitute all the values in the equation given above

$$\Rightarrow \left( \frac{7(-8) + 5(-3)}{7+5}, \frac{7(7) + 5(-4)}{7+5} \right) \quad (0.0.2)$$

$$\Rightarrow \left( \frac{-56-15}{12}, \frac{49-20}{12} \right) \quad (0.0.3)$$

$$\Rightarrow \left( \frac{-71}{12}, \frac{29}{12} \right) \quad (0.0.4)$$

Hence internal division is taking place at point

$$S = \left( \frac{-71}{12}, \frac{29}{12} \right) \quad (0.0.5)$$

Similarly,

#### 2) Finding external coordinate point :

The coordinates of point  $T$  which divides the line joining points  $A$  and  $B$  externally in the ratio  $m:n$  is given by the section formula

$$T = \left( \frac{mx_2 - nx_1}{m-n}, \frac{my_2 - ny_1}{m-n} \right) \quad (0.0.6)$$

Substitute all the values in the equation given above

$$\Rightarrow \left( \frac{7(-8) - 5(-3)}{7-5}, \frac{7(7) - 5(-4)}{7-5} \right) \quad (0.0.7)$$

$$\Rightarrow \left( \frac{-56+15}{2}, \frac{49+20}{2} \right) \quad (0.0.8)$$

$$\Rightarrow \left( \frac{-41}{2}, \frac{69}{2} \right) \quad (0.0.9)$$

Hence external division is taking place at point

$$T = \left( \frac{-41}{2}, \frac{69}{2} \right) \quad (0.0.10)$$

## Result

Plot of coordinate of the points obtained from Python code is shown below.

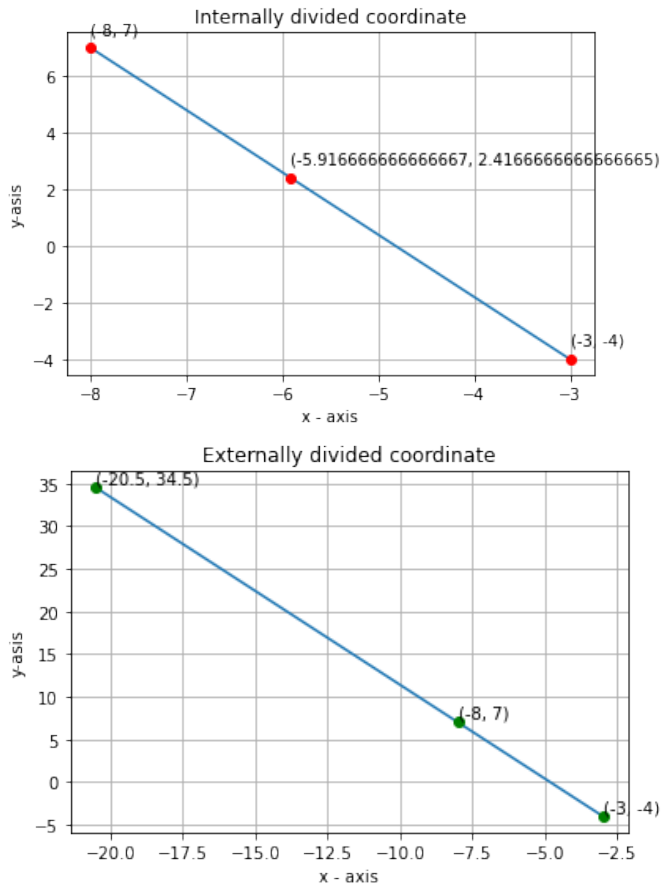


Fig. 2: Plot of coordinate of the point which divides internally and externally