# Assignment-1($EE5600$)

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***Abstract*—This assignment deals with basic coordinate geometry.**

Download tex file from

https://github.com/satyam463/EE5600Ass1/blob/main/Ass1.tex

## 1 Problem Statement

22.The coordinates of vertices of a triangle are $(x_1, y_1)$,$(x_2, y_2)$,and $(x_3, y_3)$.The line joining the first two is divided into the ratio l:k, and line joining this point of division to the opposite angular point is then divided in the ratio m:k+1.Find the coordinates of the latter point of section.

## 2 Solution

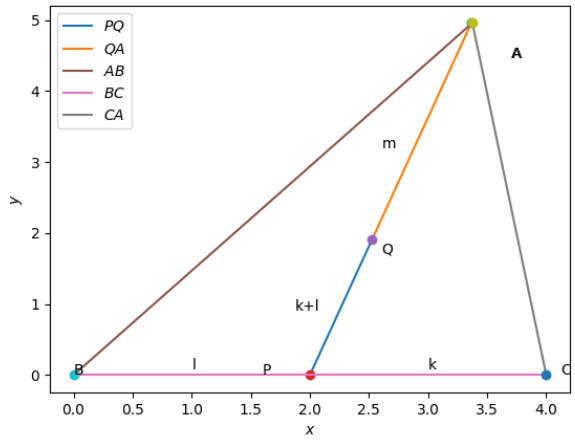


Fig. 0: Triangle

Consider Fig.0 the line joining **BC** divided into the ratio l:k can be written as

$$\mathbf{P} = \frac{1}{l+k}\begin{pmatrix} x_2 & x_1 \\ y_2 & y_1 \end{pmatrix}\begin{pmatrix} l \\ k \end{pmatrix} \tag{2.0.1}$$

$$\mathbf{P} = \frac{1}{l+k}\begin{pmatrix} x_2 l + x_1 k \\ y_2 l + y_1 k \end{pmatrix} \tag{2.0.2}$$

$$\mathbf{P} = \begin{pmatrix} \frac{x_2 l + x_1 k}{l+k} \\ \frac{y_2 l + y_1 k}{l+k} \end{pmatrix} \tag{2.0.3}$$

Now,the line joining **PA** divided into the ratio m:k+l can be written as

$$\mathbf{Q} = \frac{1}{l+k+m}\begin{pmatrix} x_3 & \frac{x_2 l + x_1 k}{l+k} \\ y_3 & \frac{y_2 l + y_1 k}{l+k} \end{pmatrix}\begin{pmatrix} m \\ k+l \end{pmatrix} \tag{2.0.4}$$

$$\mathbf{Q} = \frac{1}{l+k+m}\begin{pmatrix} mx_3 + (k+l)\frac{x_2 l + x_1 k}{l+k} \\ my_3 + (k+l)\frac{y_2 l + y_1 k}{l+k} \end{pmatrix} \tag{2.0.5}$$

$$\mathbf{Q} = \frac{1}{l+k+m}\begin{pmatrix} mx_3 + x_2 l + x_1 k \\ my_3 + y_2 l + y_1 k \end{pmatrix} \tag{2.0.6}$$

$$\mathbf{Q} = \begin{pmatrix} \frac{mx_3 + x_2 l + x_1 k}{l+k+m} \\ \frac{my_3 + y_2 l + y_1 k}{l+k+m} \end{pmatrix} \tag{2.0.7}$$

Hence, Q is the required coordinate of the latter point of section.