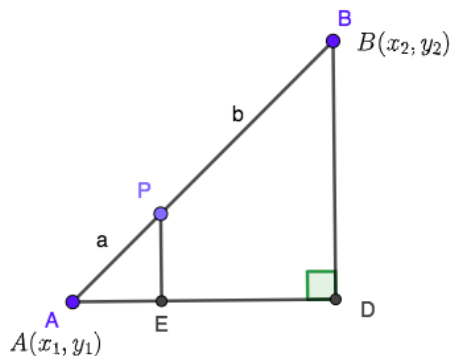Partitioning a Segment—the general case

Now, let's look at the general case. We want to find a formula for the coordinates for Point P that partition line segment AB into a ratio of a:b. We will go through the same steps as we did in the specific case when we knew the coordinates of A and B and we knew the partition ratio.

1) Find the coordinates of Point D.

2) Find the distances AD and BD.

3) What is the relationship between Triangle AEP and Triangle ADB?

4) $\dfrac{AP}{AB} = \dfrac{a}{a+b}$. $Why?$

PE has to be in the same ratio to BD as AP is to AB. $\dfrac{PE}{BD} = \dfrac{a}{a+b}$

5) Solve for PE.

AE has to be in the same ratio to AD as AP is to AB.　$\dfrac{AE}{AD} = \dfrac{a}{a+b}$

6) Solve for AE.

7) What are the coordinates of E and P?

8) What is the formula for the coordinates of Point P that partition line segment AB with A (x_1, y_1) and B (x_2, y_2) into an a : b ratio?