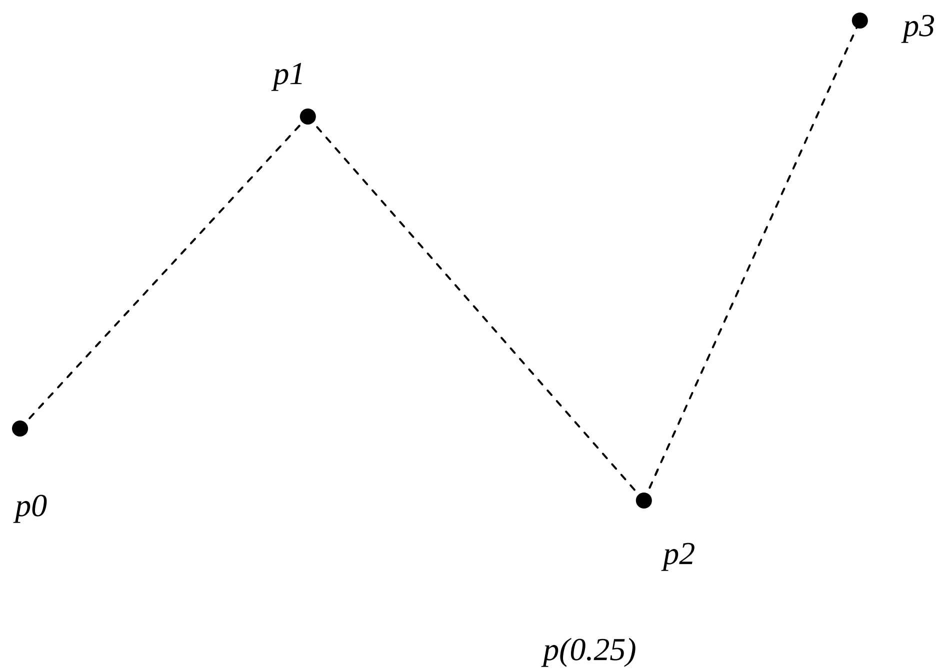
Please attempt all the 4 questions before attending tutorial.

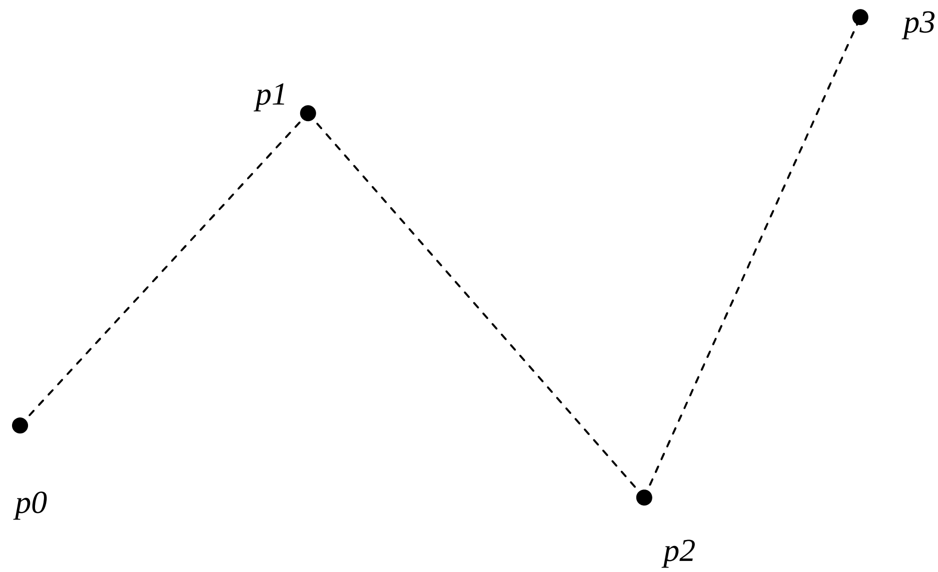
1. Prove that the subdivision method draws a cubic Bezier curve with control points c_0, c_1, c_2 and c_3. Hint: derive the formula from the subdivision method (e.g. $c_{11} = (1-t)\cdot c_1 + t\cdot c_2$) and try to show the final formula is:

$$Q(t) = \sum_{i=0}^{3} \binom{3}{i} t^i (1-t)^{3-i} c_i$$

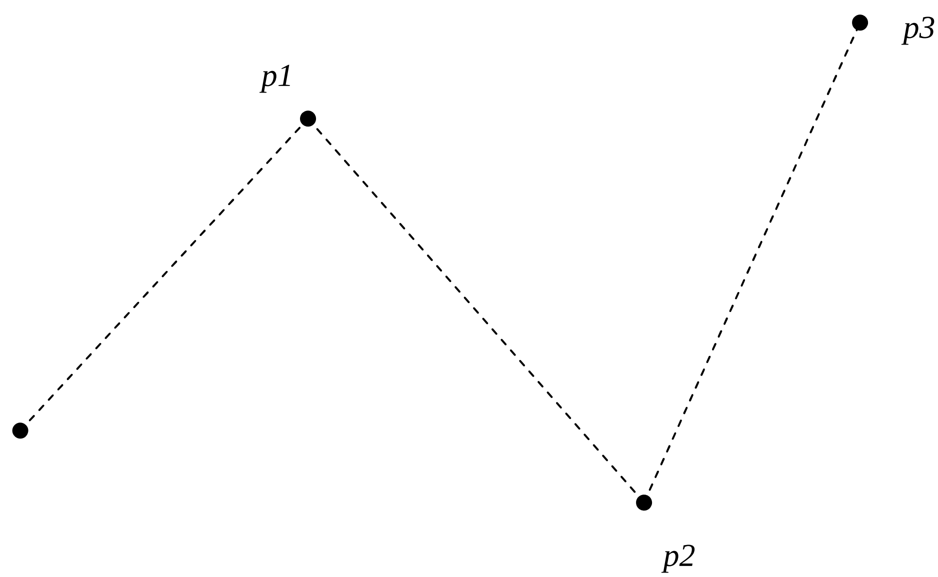
2. Differentiate the above Bezier curve with respect to t.

3. Given the following control points of a Bezier curve, compute $p(0.25)$ $p(0.5)$ and $p(0.75)$ by drawing.



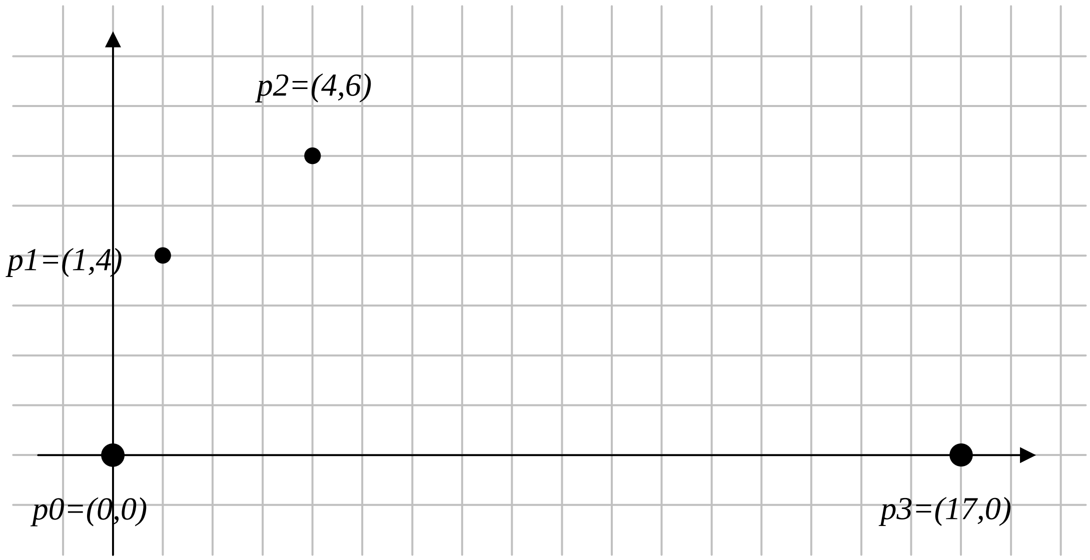


p(0.50)

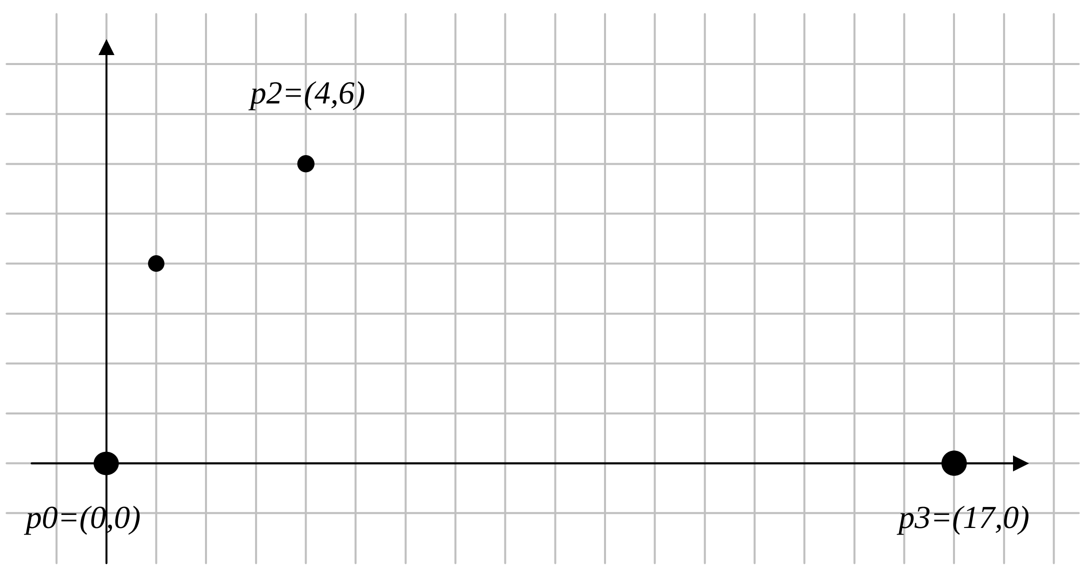


p(0.75)

4. Draw a Bezier curves in two different ways, iterative vs divide-and-conquer.
   a. With the iterative method, compute and connect points *p(0.0)*, *p(1/3)*, *p(2/3)*, and *p(1)* in the Bezier curve of the following diagram by computing directly from the Bezier equation (The formula).



   b. With the same setting compute p(0.5) first by subdivision method, then the curve is divided into two smaller Bezier curves, choose the longer one and subdivide it once more. Compare it with the previous computation.



   c. From the curve in (b), suggest some ways to further improve the approximation.