

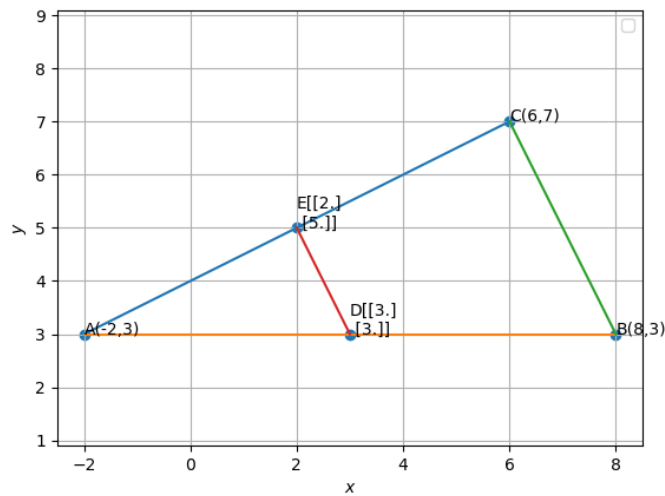
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AI25BTECH11001 - ABHISEK MOHAPATRA

Question: A line through the mid-point of a side of a triangle parallel to another side bisects the third side.

Solution:

Graph:



Consider a triangle $\triangle ABC$. Let D and E are midpoints on the sides opposite to C and B . So,

$$D = \frac{A + B}{2}, E = \frac{A + C}{2} \quad (1)$$

so the line joining the midpoints is

$$D - E = \frac{A + B}{2} - \frac{A + C}{2} = \frac{B - C}{2} = \frac{1}{2} (B - C) = \lambda (B - C) \quad (2)$$

So, the line is parallel to the third side as it $\lambda (B - C)$.

Hence, proved.