# 11.2.7

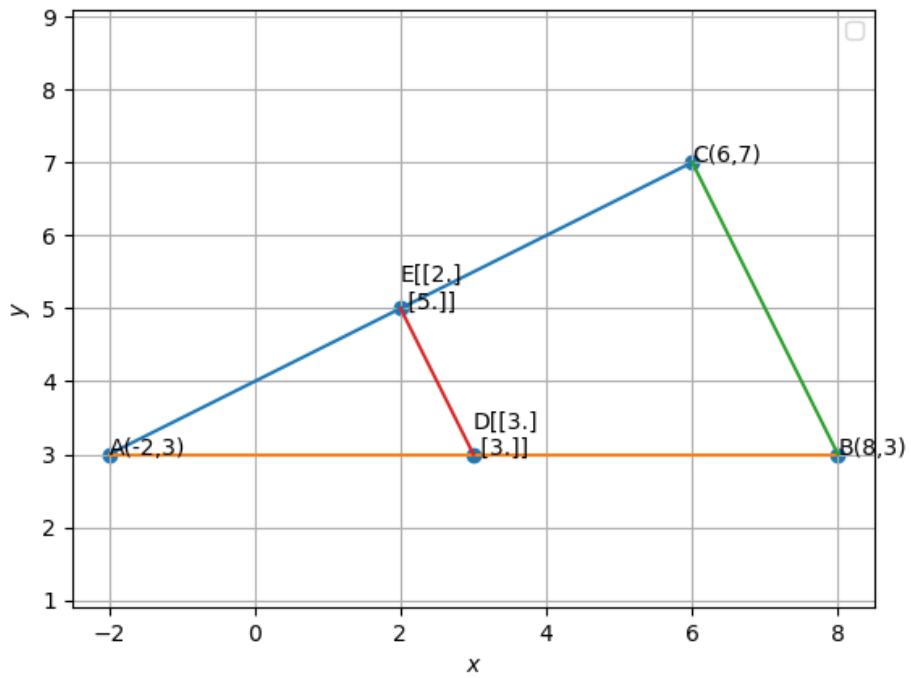
AI25BTECH11001 - ABHISEK MOHAPATRA

October 3, 2025

**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 $\Delta\mathbf{ABC}$. Let **D** and **E** are midpoints on the sides

opposite to $\mathbf{C}$ and $\mathbf{B}$. So,

$$\mathbf{D} = \frac{\mathbf{A}+\mathbf{B}}{2}, \mathbf{E} = \frac{\mathbf{A}+\mathbf{C}}{2} \tag{0.1}$$

so the line joining the midpoints is

$$\mathbf{D}-\mathbf{E} = \frac{\mathbf{A}+\mathbf{B}}{2} - \frac{\mathbf{A}+\mathbf{C}}{2} = \frac{\mathbf{B}-\mathbf{C}}{2} = \frac{1}{2}(\mathbf{B}-\mathbf{C}) = \lambda(\mathbf{B}-\mathbf{C}) \tag{0.2}$$

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