Honors Geometry
5.5 Midsegment Theorem

Try this!

ΔABC has vertices A(-1,6), B(-4,-3), and C(7,-5). D and E are the midpoints of $\overline{AC}$ and $\overline{BC}$, respectively. Verify the midsegment theorem.

Key

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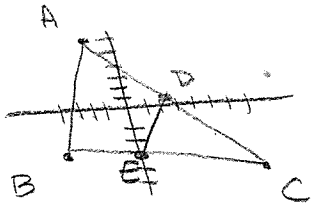

Midpt $\overline{AC} = \left(\frac{-1+7}{2}, \frac{6-5}{2}\right) = \left(3, \frac{1}{2}\right)$ D

Midpt $\overline{BC} = \left(\frac{-4+7}{2}, \frac{-3-5}{2}\right) = \left(\frac{3}{2}, -4\right)$ E

$m_{\overline{AB}} = \frac{-3-6}{-4+1} = \frac{-9}{-3} = 3$

$m_{\overline{DE}} = \frac{-4-\frac{1}{2}}{\frac{3}{2}-3} = \frac{-\frac{9}{2}}{-\frac{3}{2}} = 3$

$AB = \sqrt{(-1+4)^2+(6+3)^2}$

$= \sqrt{9+81}$

$= \sqrt{90}$

$= 3\sqrt{10}$

$DE = \sqrt{\left(3-\frac{3}{2}\right)^2+\left(\frac{1}{2}+4\right)^2}$

$= \sqrt{\left(\frac{3}{2}\right)^2+\left(\frac{9}{2}\right)^2}$

$= \sqrt{\frac{9}{4}+\frac{81}{4}}$

$= \sqrt{\frac{90}{4}} = \frac{3\sqrt{10}}{2}$