6.5 Triangle Midsegment Theorem

Objective: Today we will use the midsegments of triangles in the coordinate plane
& use the Triangle Midsegment Theorem to find distances.

Warm-up: How do you find a midpoint of a line segment? What is the **Midpoint Formula**?
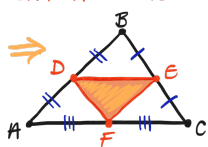

6.5 TRIANGLE MIDSEGMENT THEOREM

- **MIDSEGMENT OF A TRIANGLE**

  a **MIDSEGMENT of a TRIANGLE** is a segment that connects the midpoints of two sides of the triangle.

  $\overline{DE}$ is a midsegment of △ABC.
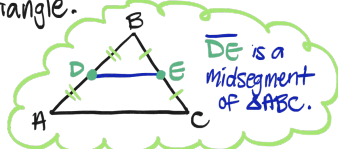
- **EVERY** triangle has **THREE** midsegments, which form the **MIDSEGMENT TRIANGLE**.

  The midsegments of △ABC at the right are $\overline{DE}$, $\overline{EF}$, & $\overline{FD}$. So the **MIDSEGMENT △** is △DEF.

TRIANGLE MIDSEGMENT THM
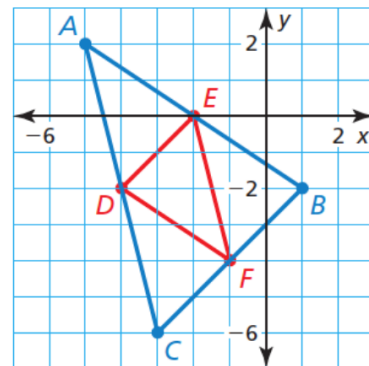
The segment connecting the midpoints of two sides of a triangle is *parallel* to the third side & it is ½ its length.

$\overline{DE}$ is a midsegment of △ABC, $\overline{DE} \parallel \overline{AC}$, AND $DE = ½ AC$.
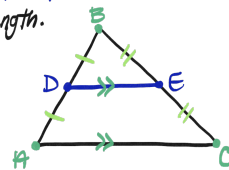
In Exercises 3–6, use the graph of △ABC with midsegments $\overline{DE}$, $\overline{EF}$, and $\overline{DF}$. *(See Example 1.)*
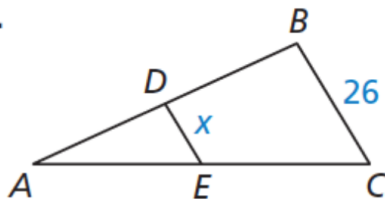
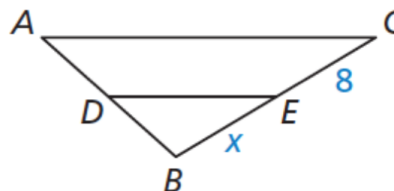3. Find the coordinates of points D, E, and F.

4. Show that $\overline{DE}$ is parallel to $\overline{CB}$ and that $DE = \frac{1}{2}CB$.

In Exercises 7–10, $\overline{DE}$ is a midsegment of △ABC. Find the value of x. *(See Example 3.)*
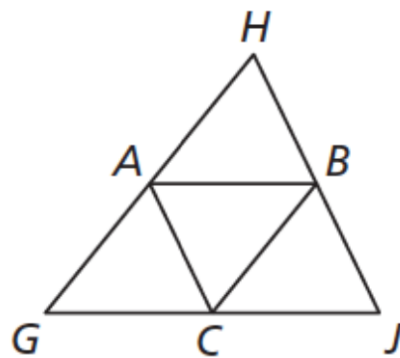
7.

26

x

10.

8

x

H

A   B

G   C   J

17. When $AB = 3x + 8$ and $GJ = 2x + 24$, what is AB?

19. When $GH = 7z - 1$ and $CB = 4z - 3$, what is GA?

27. ATTENDING TO PRECISION The points $P(2, 1)$, $Q(4, 5)$, and $R(7, 4)$ are the midpoints of the sides of a triangle. Graph the three midsegments. Then show how to use your graph and the properties of midsegments to draw the original triangle. Give the coordinates of each vertex.