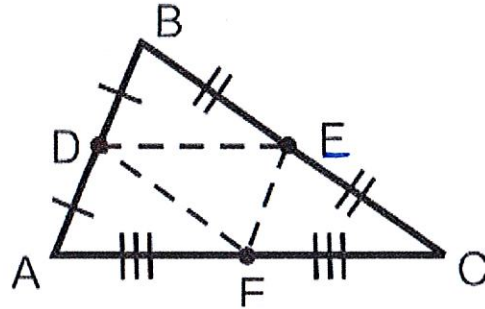
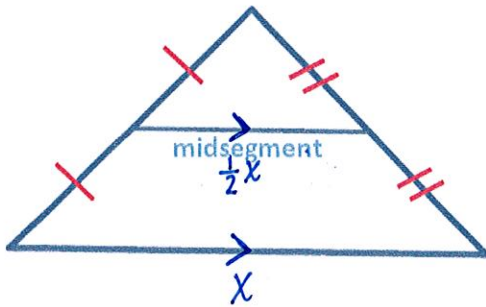


Day 2 – Triangle Midsegment Theorem and Triangle Proportionality Theorem

A **midsegment** of a triangle is a segment that joins the midpoints of two sides of the triangle. Every triangle has three midsegments, which forms the midsegment triangle.

Triangle Midsegment Theorem: A midsegment of a triangle is parallel to a side of the triangle, and its length is half the length of that side.



The Midsegment is:

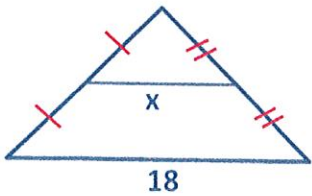
- Parallel to one side of the triangle
- Is half the length of the parallel side
- Connects to the midpoints

Midsegments: $\overline{DE}, \overline{EF}, \overline{FD}$

Midsegment Triangle: $\triangle DEF$

Practice:

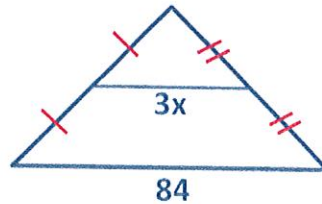
A. Solve for x:



$$x = \frac{1}{2}(18)$$

$$\boxed{x=9}$$

B. Solve for x:

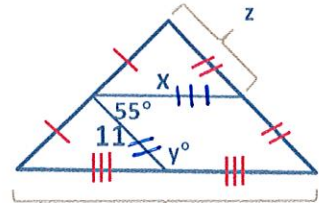


$$3x = \frac{1}{2}(84)$$

$$3x = 42$$

$$\boxed{x=14}$$

C. Solve for x, y, and z:



$$x = \frac{1}{2}(24)$$

$$y = 180 - 55 - 11$$

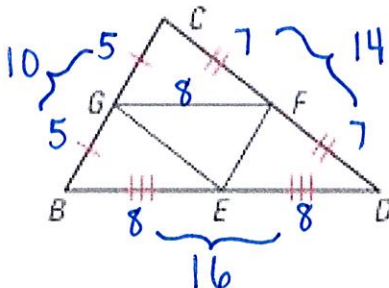
$$z = 11$$

$$\boxed{x=12}$$

$$\boxed{y=114}$$

$$\boxed{z=11}$$

D. Given $CD = 14$, $GF = 8$, and $GC = 5$, Find the perimeter of $\triangle BCD$.

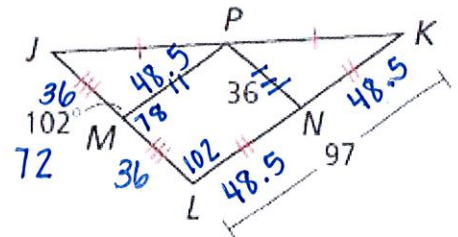


E. Find the measure of the following:

$$\overline{JL} = 72$$

$$\overline{PM} = 48.5$$

$$\angle MLK = 102^\circ$$

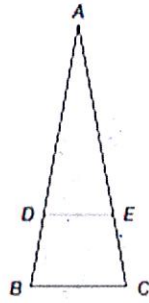


Triangle Proportionality Theorem (Side Splitter Theorem)

The **Triangle Proportionality Theorem**, which states "If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally."

If: $\overline{DE} \parallel \overline{BC}$

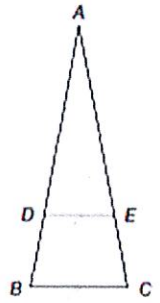
Then: $\frac{AD}{DB} = \frac{AE}{EC}$



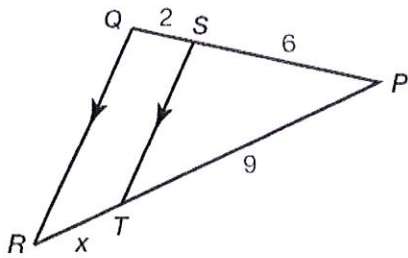
The **Converse of the Triangle Proportionality Theorem**, states "If a line divides two sides of a triangle proportionally, then it is parallel to the third side."

If: $\frac{AD}{DB} = \frac{AE}{EC}$

Then: $\overline{DE} \parallel \overline{BC}$



Example 1: Find the value of x if $ST \parallel QR$.

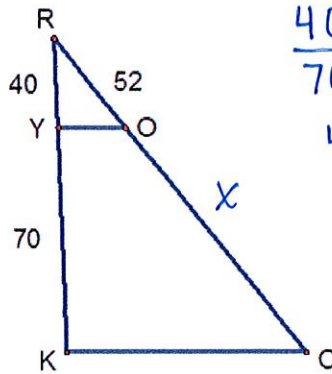


$$\frac{6}{2} = \frac{9}{x}$$

$$6x = 18$$

$$x = 3$$

Example 2: Find RC if $YO \parallel KC$.



$$\frac{40}{70} = \frac{52}{x}$$

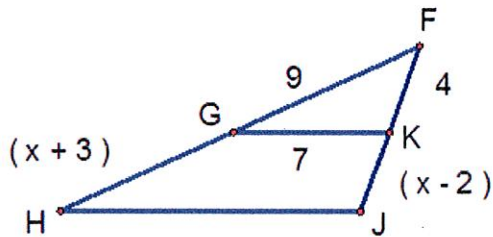
$$40x = 3640$$

$$x = 91$$

$$\overline{RC} = 52 + 91$$

$$\overline{RC} = 143$$

Example 3: Find the value of x if $GK \parallel HJ$. $\overline{AE} \parallel \overline{BD}$?



$$\frac{9}{x+3} = \frac{4}{x-2}$$

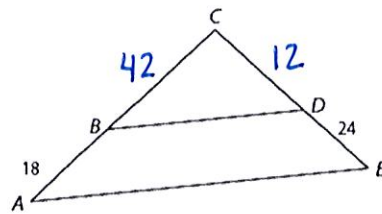
$$9(x-2) = 4(x+3)$$

$$9x - 18 = 4x + 12$$

$$5x = 30$$

$$x = 6$$

Example 4: If AC = 60 units and EC = 36 units, is



$$\frac{42}{18} = \frac{12}{24}$$

$$\frac{7}{3} = \frac{1}{2} \times$$

No, \overline{AE} is not parallel to \overline{BD}