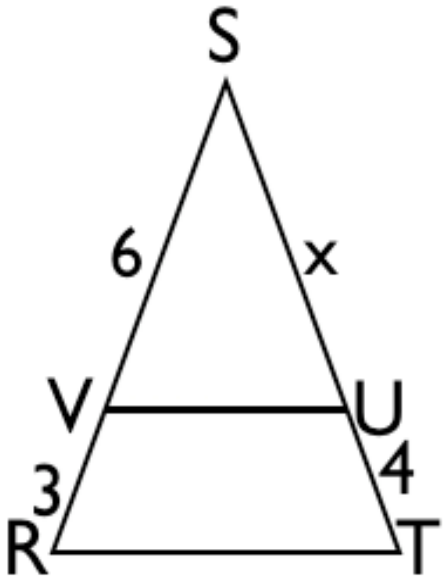
7-4: Parallel Lines and Proportional Parts

- 1. Triangle Proportionality theorem:

If a line is parallel to a side of a triangle, it cuts the other two sides into proportional parts.



Example 1: find x

$$\frac{6}{3} = \frac{x}{4}$$

$$x = 8$$

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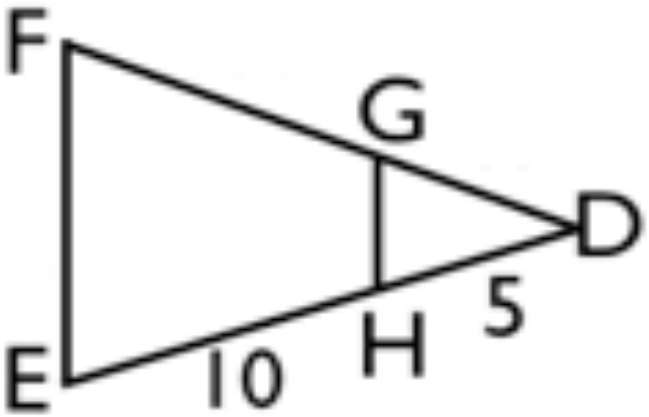
- Example 2: In triangle DEF DG= ½ GF. Determine if GH||FE.

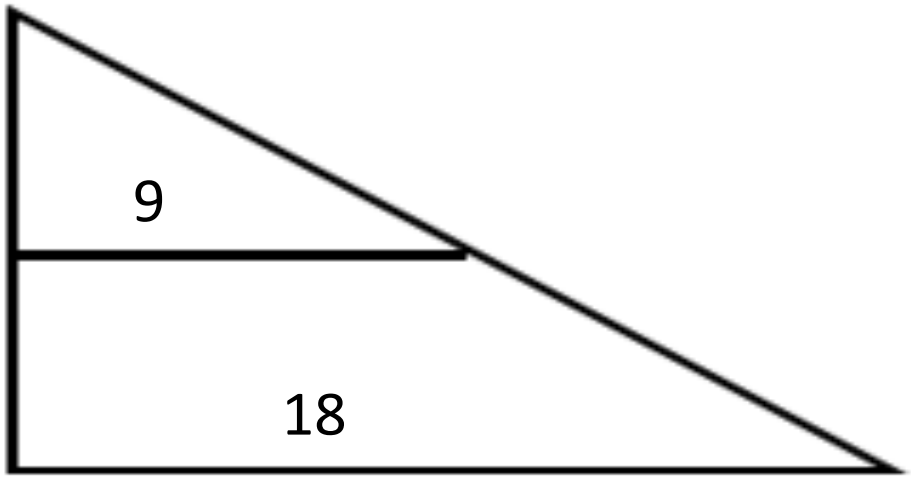


7-4: Parallel Lines and Proportional Parts

- A **midsegment** of a triangle is a segment connecting the midpoints of two sides of the triangle.
- A **midsegment** is ALWAYS parallel to the third side of the triangle

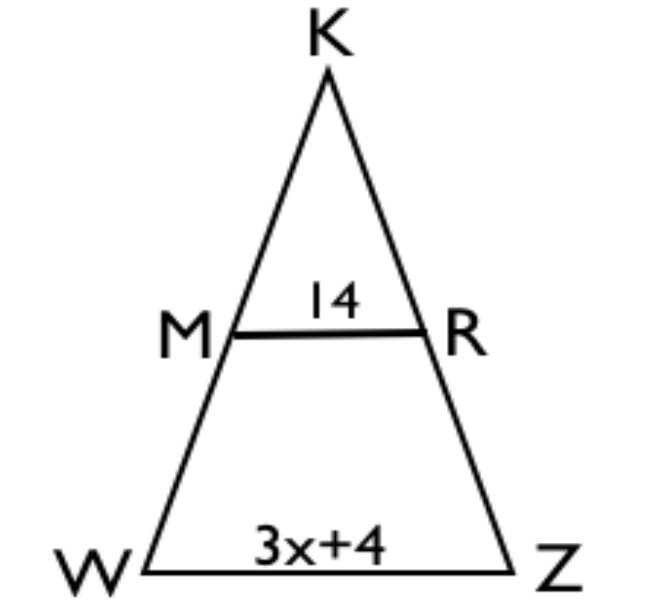
7-4: Parallel Lines and Proportional Parts

- **Triangle Midsegment Theorem:**
- The midsegment of a triangle is always parallel to the third side and is half the length of the third side.



7-4: Parallel Lines and Proportional Parts

- Examples: Find the value of x in each diagram.
- 1.



MR is a midsegment

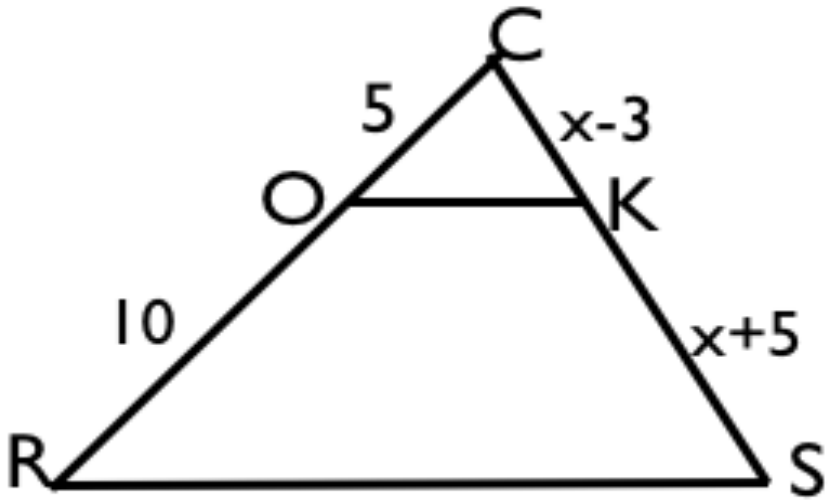
$$3x + 4 = 28$$

$$3x = 24$$

$$x = 8$$

7-4: Parallel Lines and Proportional Parts

- 2.



$$\frac{5}{10} = \frac{x-3}{x+5}$$

$$5(x+5) = 10(x-3)$$

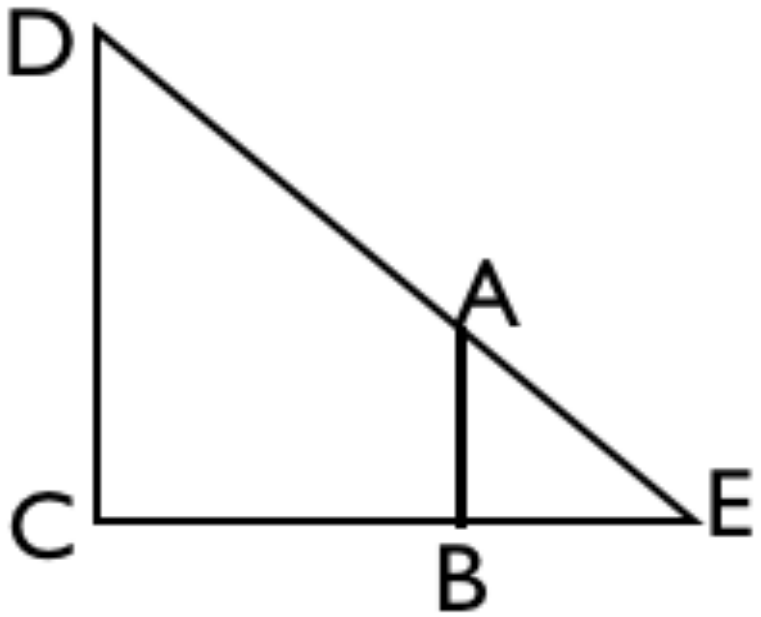
$$5x + 25 = 10x - 30$$

$$55 = 5x$$

$$11 = x$$

7-4: Parallel Lines and Proportional Parts

- 3. If AE = 6, BE = 4, AD = 8 and CE = 12, is AB || CD?



$$No, \frac{6}{8} \neq \frac{4}{8}$$

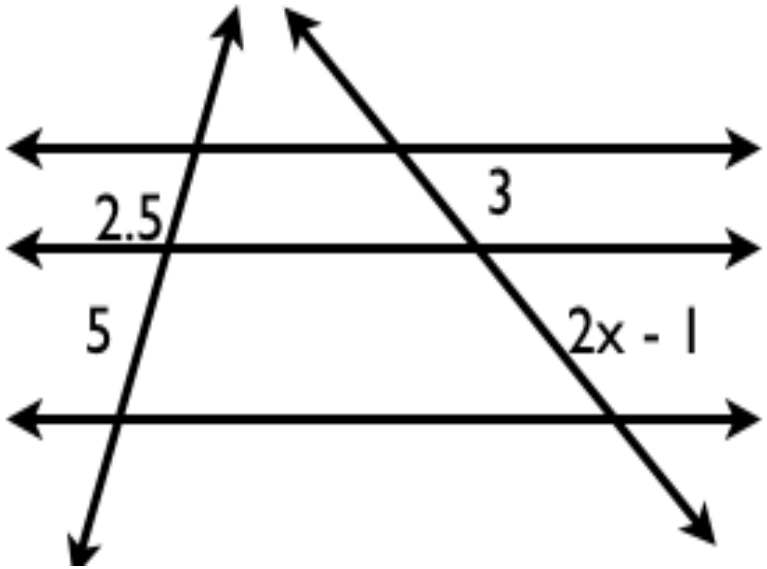
7-4: Parallel Lines and Proportional Parts

- **Corollaries for Parallel Lines and Proportions**
- 1. Three or more parallel lines create proportional parts on transversals

- Example: Find x.

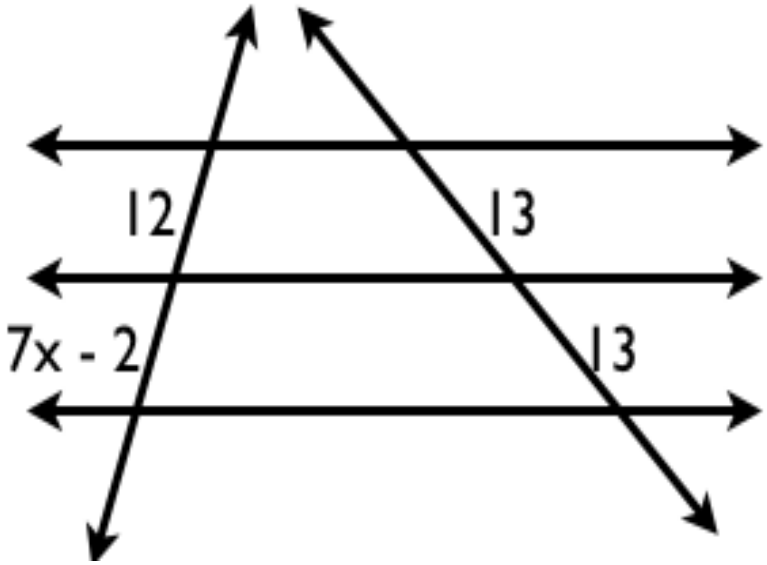
$$\frac{2.5}{5} = \frac{3}{2x-1}$$

$$2.5(2x-1) = 15$$
$$5x - 2.5 = 15$$
$$5x = 17.5$$
$$x = 3.5$$



7-4: Parallel Lines and Proportional Parts

- 2. Three or more parallel lines that create congruent segments on 1 transversal create congruent segments on any transversal.
- Example: Find x.

$$12 = 7x - 2$$

$$2 = x$$