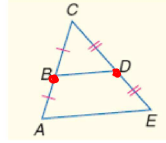


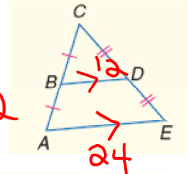
Objectives: Students will be able to use proportional parts of triangles.

Midsegment: A segment connecting the midpoints of two sides of a triangle



Triangle Midsegment Theorem: If a segment joins the midpoints of two sides of a triangle, then the segment is parallel to the third side and is $\frac{1}{2}$ its length

little midsegment $\rightarrow \div 2$
big segment $\rightarrow \times 2$

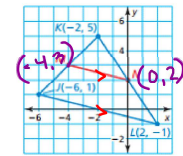


If B and D are midpoints of \overline{AC} and \overline{BC} respectively, $\overline{BD} \parallel \overline{AE}$ and $BD = \frac{1}{2}AE$.

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Example 1: Given $\triangle KLM$ and midsegment \overline{MN} , show that $\overline{MN} \parallel \overline{KL}$ and $MN = \frac{1}{2}KL$.



$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m_{MN} = \frac{2-3}{0-4} = \frac{-1}{4}$$

same slope

$$m_{KL} = \frac{-1-1}{-6-2} = \frac{-2}{-8} = \frac{-1}{4}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

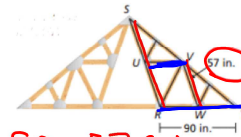
$$KL = \sqrt{(-6-2)^2 + (1-5)^2} = \sqrt{8^2 + 4^2} = \sqrt{64+4} = \sqrt{68} = 8.24$$

$$MN = \sqrt{(-4-0)^2 + (3-2)^2} = \sqrt{16+1} = \sqrt{17} = 4.12$$

$$MN = \frac{1}{2}KL = \frac{1}{2}(8.24) = 4.12$$

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Example 2: Triangles are used for strength in roof trusses. In the diagram, \overline{UV} and \overline{VW} are midsegments of $\triangle RST$. Find UV and RS .

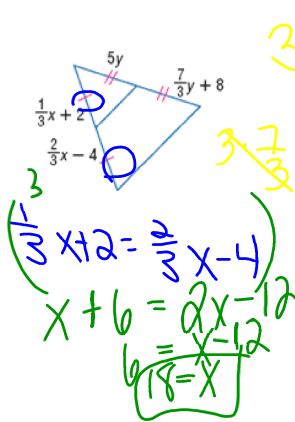


$$RS = 57(2) = 114 \text{ in}$$

$$UV = \frac{1}{2}(90) = 45 \text{ in}$$

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Example 3: Solve for x and y.



$$3[5y = \frac{7}{3}y + 8]$$

$$15y = 7y + 24$$

$$8y = 24$$

$$y = 3$$

$$\frac{1}{3}x + 2 = \frac{2}{3}x - 4$$

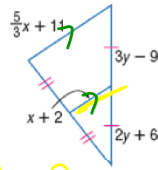
$$x + 6 = 2x - 12$$

$$18 = x$$

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Example 4: Solve for x and y.



$$2(x+2) = \frac{5}{3}x + 11$$
$$(2x+4 = \frac{5}{3}x+11) \cdot 3$$

$$6x+12 = 5x+33$$

$$x+12 = 33$$

$$x = 21$$

$$3y-9 = 2y+6$$
$$y-9 = 6$$
$$y = 15$$

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