

#7,8

If 3 parallel lines intersect 2 transversals, then they divide the transversals proportionally.

Geometry
Proportion Parts and Midsegments of Triangles

Name: _____

Date: _____

Proportional Parts of Triangles

- In any triangle, a line parallel to one side of a triangle separates the other two sides proportionally.

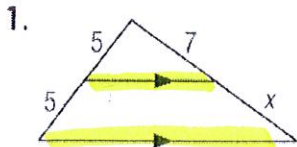


- The converse is also true.

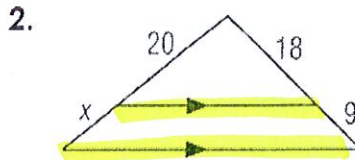
If $\overline{XY} \parallel \overline{RS}$, then $\frac{RX}{XT} = \frac{SY}{YT}$. If $\frac{RX}{XT} = \frac{SY}{YT}$, then $\overline{XY} \parallel \overline{RS}$.

$\frac{\text{Part}}{\text{Part}} = \frac{\text{Part}}{\text{Part}}$ OR $\frac{\text{Part}}{\text{Whole}} = \frac{\text{Part}}{\text{Whole}}$

Practice:



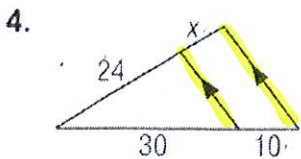
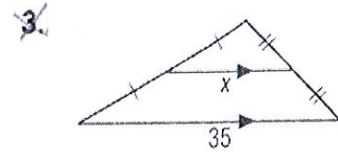
$$\frac{5}{5} = \frac{7}{x} \quad \boxed{x=7}$$



$$\frac{20}{x} = \frac{18}{9}$$

$$18x = 180$$

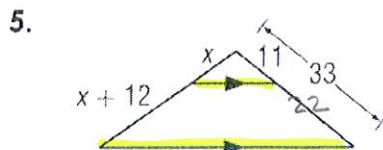
$$\boxed{x=10}$$



$$\frac{x}{24} = \frac{10}{30}$$

$$30x = 240$$

$$\boxed{x=8}$$



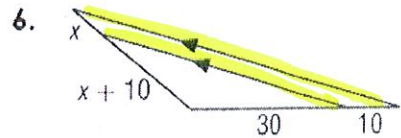
$$\frac{x}{x+12} = \frac{11}{22}$$

$$22x = 11(x+12)$$

$$22x = 11x + 132$$

$$11x = 132$$

$$\boxed{x=12}$$



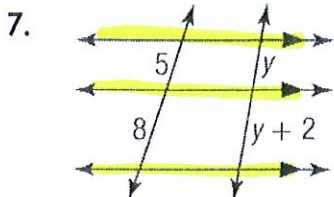
$$\frac{x}{x+10} = \frac{10}{30}$$

$$30x = 10(x+10)$$

$$30x = 10x + 100$$

$$20x = 100$$

$$\boxed{x=5}$$

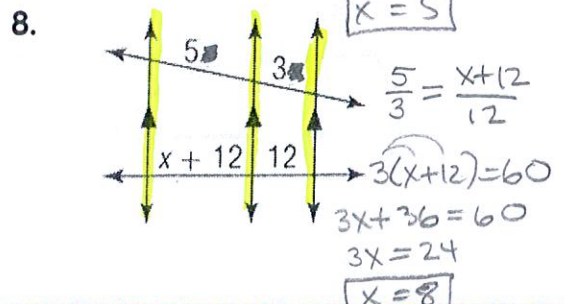


$$\frac{5}{8} = \frac{y}{y+2}$$

$$8y = 5(y+2)$$

$$8y = 5y + 10$$

$$3y = 10 \quad \boxed{y = \frac{10}{3}}$$



$$\frac{5}{3} = \frac{x+12}{12}$$

$$3(x+12) = 60$$

$$3x + 36 = 60$$

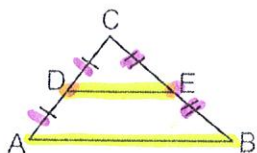
$$3x = 24$$

$$\boxed{x=8}$$

Midsegments of Triangles

Midsegment of a Triangle

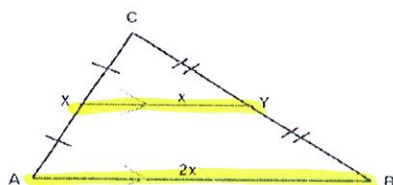
A midsegment of a triangle is a segment joining the midpoints of the two sides of a triangle.



\overline{DE} is a midsegment of $\triangle ABC$

Triangle Midsegment:

1. Parallel to one side of the triangle
2. Half the length of the parallel side
3. Connects to the midpoints

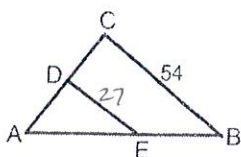


$$\overline{AB} \parallel \overline{XY}$$

$$XY = \frac{1}{2} AB \text{ or } AB = 2(XY)$$

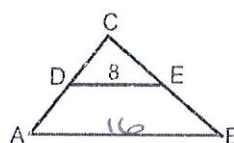
Examples

1. Given DE is the length of the midsegment. What is its length?
2. Given DE is the length of the midsegment. Find AB.



$$\frac{1}{2} (\overline{CB}) = \overline{DE}$$

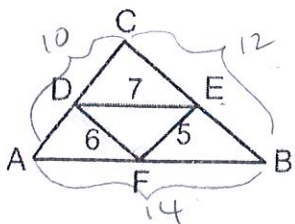
$$\frac{1}{2} (54) = \boxed{27}$$



$$2(\overline{DE}) = \overline{AB}$$

$$2(8) = \boxed{16}$$

3. Given DE, DF, and FE are the lengths of midsegments. Find the perimeter of $\triangle ABC$. How does this compare to the perimeter of $\triangle DEF$?

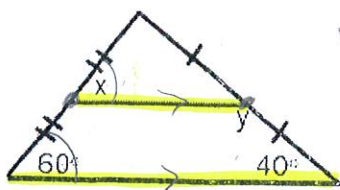


$$P_{\triangle DEF} = 7 + 5 + 6 = 18$$

$$P_{\triangle ABC} = 14 + 10 + 12 = 36$$

$\triangle ABC$ is twice the perimeter of $\triangle DEF$.

4. Solve for x and y.

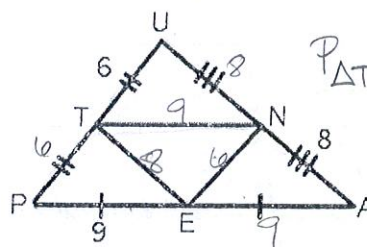


$$x = 60^\circ$$

$$y = 180 - 40$$

$$y = 140^\circ$$

5. What is the perimeter of $\triangle TEN$?



$$P_{\triangle TEN} = 8 + 6 + 9 = \boxed{23}$$