

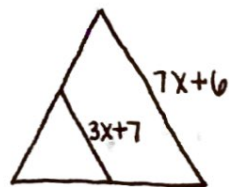
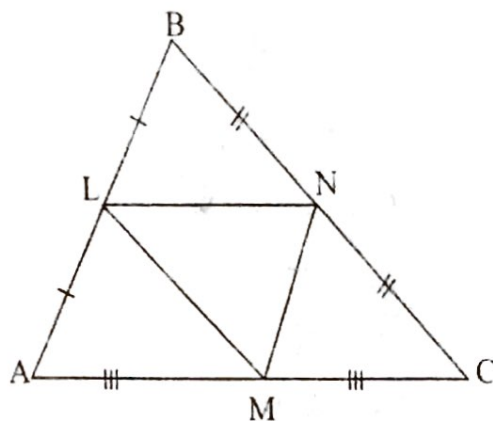
Name: _____ Date: _____

Triangle Midsegment and Proportionality Theorem

Triangle Midsegment Theorem: The segment connecting the midpoints of two sides of the triangle is parallel to the third side and half the length of the third side.

Use $\triangle ABC$, where L, M, and N are midpoints of the sides.

1. $\overline{LM} \parallel \overline{BC}$
2. $\overline{AB} \parallel \overline{MN}$
3. If $AC = 20$, then $LN = \underline{10}$
4. If $MN = 7$, then $AB = \underline{14}$
5. If $NC = 9$, then $LM = \underline{9}$
6. If $LM = 3x + 7$, and $BC = 7x + 6$, then $LM = \underline{31}$



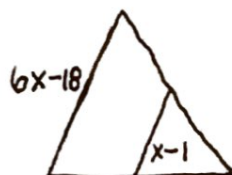
$$2(3x+7) = 7x+6$$

$$6x+14 = 7x+6$$

$$\begin{array}{r} -6x \\ -6x \\ \hline 14 = x+6 \\ -6 \\ -6 \\ \hline 8 = x \end{array}$$

$$LM = 3(8) + 7 = \boxed{31}$$

7. If $MN = x - 1$, and $AB = 6x - 18$, then $AB = \underline{6}$



$$2(x-1) = 6x-18$$

$$2x-2 = 6x-18$$

$$4x = 16$$

$$\boxed{x=4}$$

$$OR \quad x-1 = \frac{1}{2}(6x-18)$$

$$2(x-1) = 6x-18$$

$$2x-2 = 6x-18$$

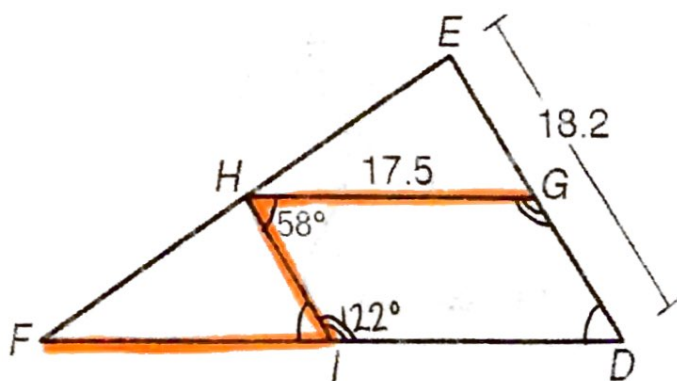
$$-4x = -16$$

$$\boxed{x=4}$$

$$AB = 6(4) - 18 = \boxed{6}$$

8. Find each measure. H, G, and I are all midpoints.

- a) $HI \underline{9.1}$ b) $DF \underline{35}$
- c) $GE \underline{9.1}$ d) $m\angle HIF \underline{58^\circ}$
- e) $m\angle HGD \underline{122^\circ}$ f) $m\angle D \underline{58^\circ}$



Triangle Proportionality Theorem: If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally.

Find the value of x:

9.

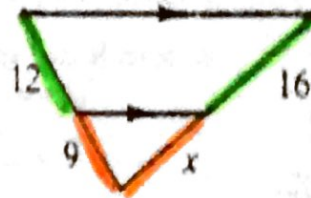


$$\frac{33}{x} = \frac{27}{18}$$

$$27x = 594$$

$$x = 22$$

10.



$$\frac{9}{12} = \frac{x}{16}$$

$$12x = 144$$

$$x = 12$$

11.



$$27 - 15 = 12$$

$$\frac{12}{15} = \frac{x}{20}$$

$$15x = 240$$

$$x = 16$$

12.

$$\frac{18}{x-1} = \frac{21}{x}$$

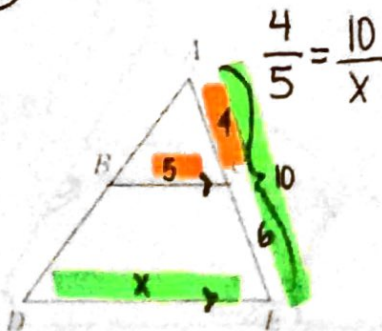
$$21x - 21 = 18x$$

$$-21 = -3x$$

$$x = 7$$



13.



$$\frac{4}{5} = \frac{10}{x}$$

14. $\frac{6}{0.9} = \frac{18}{h}$

$$16.2 = 6h$$

$$h = 2.7$$

