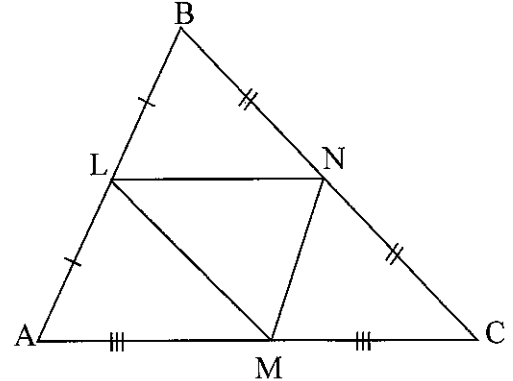


Name: Key Date: \_\_\_\_\_

**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  $LN = 10$

4. If  $MN = 7$ , then  $AB = 14$

5. If  $NC = 9$ , then  $LM = 9$

6. If  $LM = 3x + 7$ , and  $BC = 7x + 6$ , then  $LM = 31$

$3x + 7 = \frac{1}{2}(7x + 6)$

$6x + 14 = 7x + 6$

$8 = x$

$LM = 3(8) + 7$

$= 24 + 7$

$= 31$

7. If  $MN = x - 1$ , and  $AB = 6x - 18$ , then  $AB = 6$

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

$x - 1 = 3x - 9$

$8 = 2x$   
 $x = 4$

$AB = 6(4) - 18$

$= 24 - 18$

$= 6$

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

a)  $HI = 9.1$

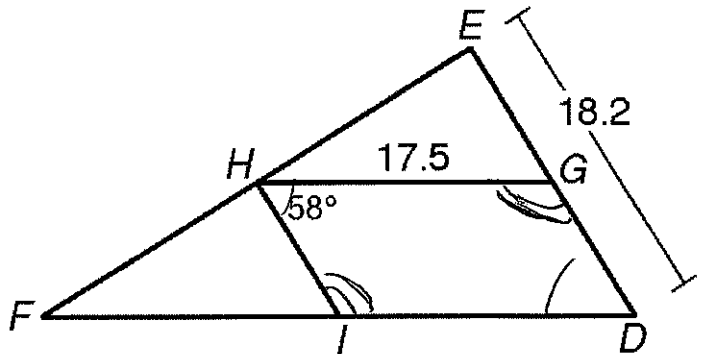
b)  $\angle D = 35^\circ$

c)  $GE = 9.1$

d)  $m\angle HIF = 58^\circ$

e)  $m\angle HGD = 122^\circ$

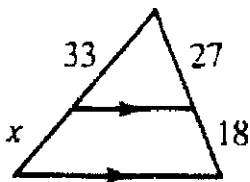
f)  $m\angle D = 35^\circ$



**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.

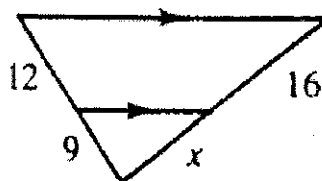


$$\frac{33}{x} = \frac{27}{18}$$

$$27x = 594$$

$$x = 22$$

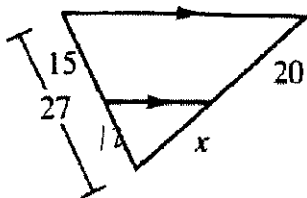
10.



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

$$12x = 144$$

11.

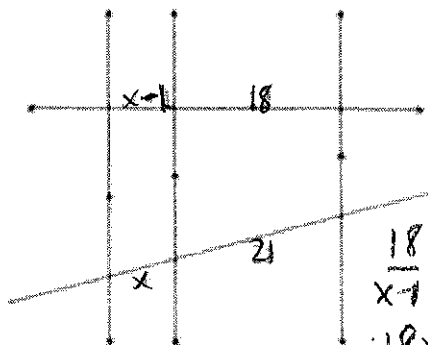


$$\frac{12}{15} = \frac{x}{20}$$

$$15x = 240$$

$$x = 16$$

12.



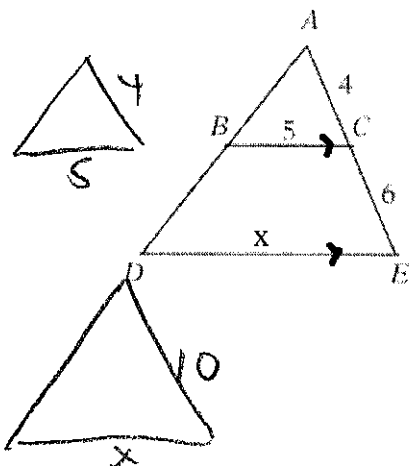
$$\frac{18}{x-1} = \frac{20}{x}$$

$$18x = 20x - 20$$

$$20 = 2x$$

$$x = 10$$

13.

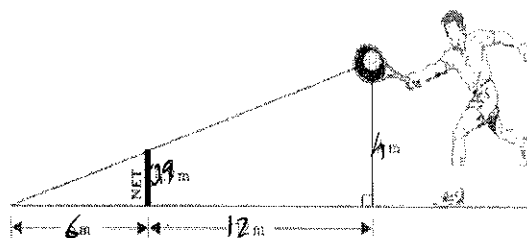


$$\frac{5}{x} = \frac{4}{10}$$

$$4x = 50$$

$$x = 12.5$$

14.



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

$$6h = 16.2$$

$$h = 2.7$$