

Geometry

Ch. 5 Handout 5.1

Midsegments of Triangles

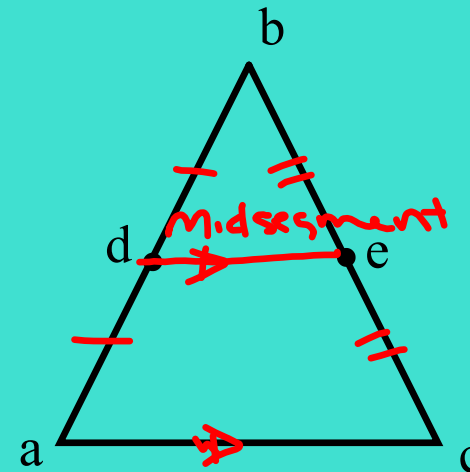
Theorem 5.1: Triangle Midsegment Theorem

If a segment joins the midpoint of two sides of a triangle, then the segment is parallel to the third side, and is half its length.

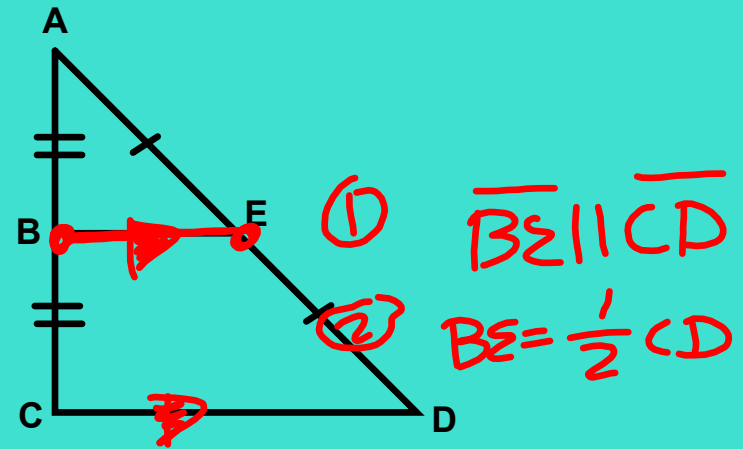
Given: d is the midpoint of $\overline{ab}$.

e is the midpoint of $\overline{bc}$.

$$\begin{aligned} 1) \overline{de} &\parallel \overline{ac} \\ 2) de &= \frac{1}{2}ac \\ \text{OR } 2de &= ac \end{aligned}$$



$\overline{BE}$ is a midsegment
of triangle ACD.



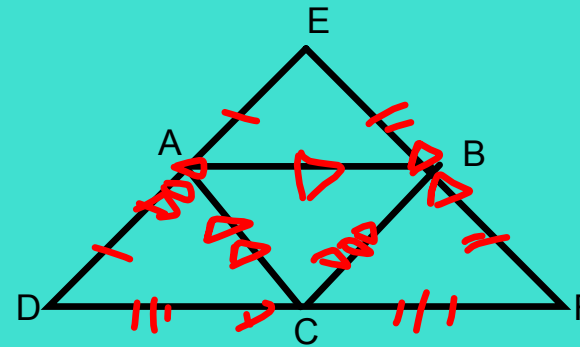
In triangle DEF, A, B, and C are midpoints.

Name all pairs of parallel segments.

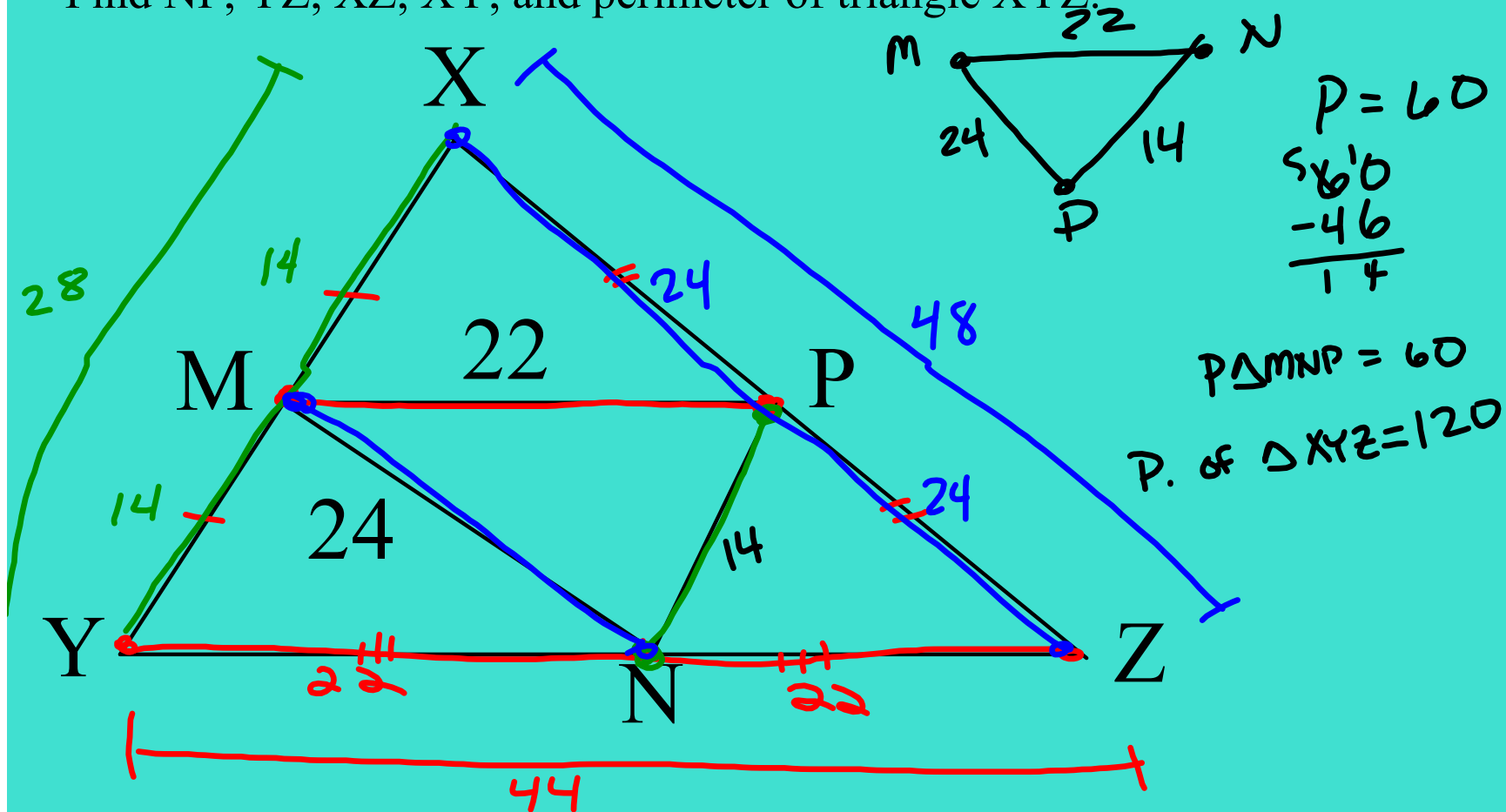
$$\overline{BC} \parallel \overline{DE}$$

$$\overline{AB} \parallel \overline{DF}$$

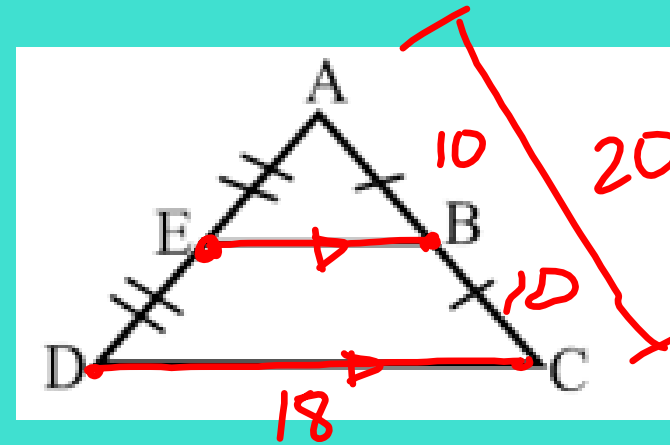
$$\overline{AC} \parallel \overline{EF}$$



1. In $\triangle XYZ$, M, N, and P are midpoints. The perimeter of $\triangle MNP$ is 60. Find NP, YZ, XZ, XY, and perimeter of triangle XYZ.



$AB = 10$ and $CD = 18$. Find EB , BC , and AC .



$$EB = 9$$

$$BC = 10$$

$$AC = 20$$

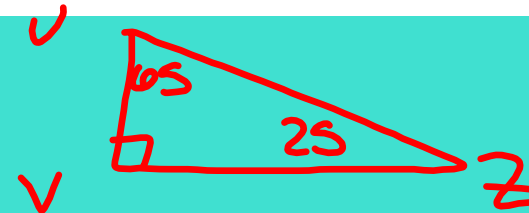
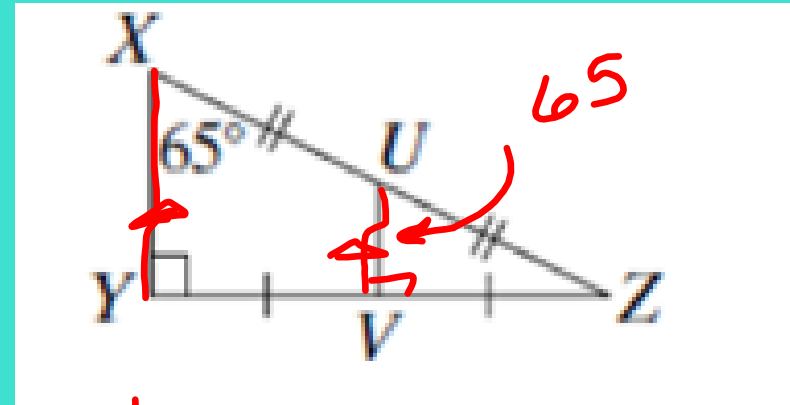
$$EB = \frac{1}{2}(DC)$$

$$EB = \frac{1}{2}(18)$$

Find the measure of the following angles:

$$m\angle VUZ = 65^\circ$$

$$m\angle Z = 25^\circ$$

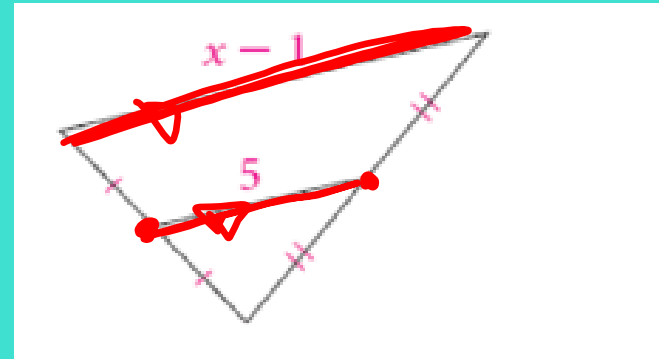


Find the value of x.

$$2 \cdot 5 = \frac{1}{2}(x-1)$$

$$10 = x - 1$$

$$\boxed{x = 11}$$



Solve for x , y , and z .

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

$$4x = x + 6$$

$$-x \quad -x$$

$$3x = 6$$

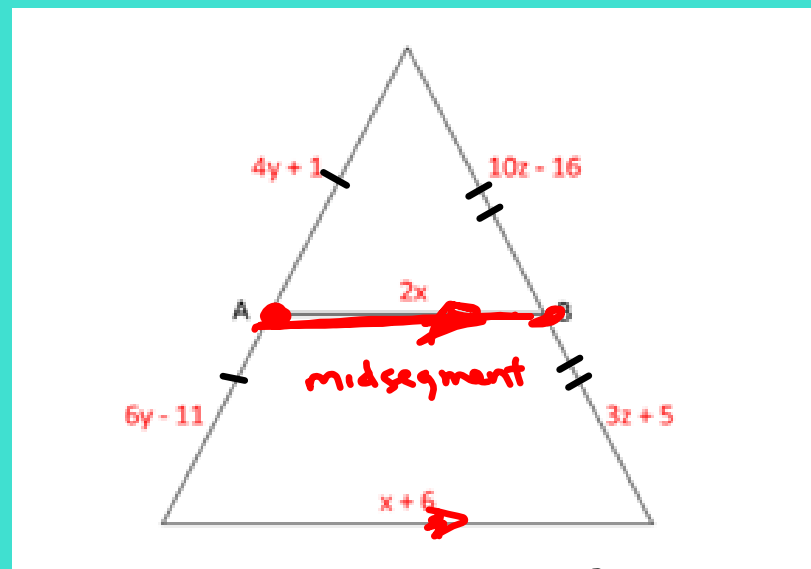
$$\boxed{x = 2}$$

$$4y + 1 = 6y - 11$$

$$-4y + 11 \quad -4y + 11$$

$$12 = 2y$$

$$\boxed{y = 6}$$



$$10z - 16 = 3z + 5$$

$$-3z + 16 \quad -3z + 16$$

$$7z = 21$$

$$\boxed{z = 3}$$

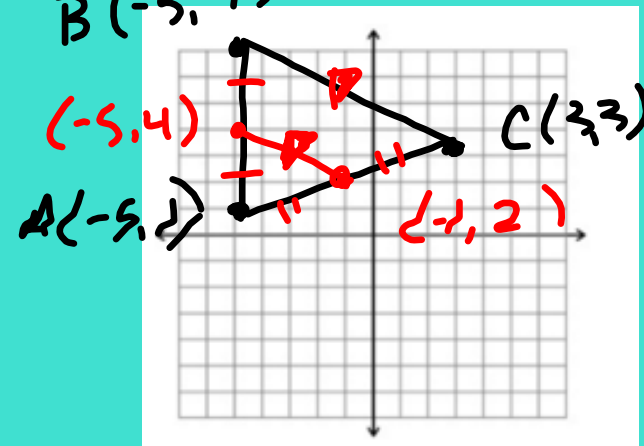
The vertices of a triangle are A(-5,1), B(-5, 7), and C(3, 3).

What is the midpoint of $\overline{AB}$? $(-5, 4)$

midpoint Formula $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$ $\left(\frac{-5 + -5}{2}, \frac{7 + 1}{2} \right)$

What is the midpoint of $\overline{AC}$?

$$\left(\frac{-5 + 3}{2}, \frac{1 + 3}{2} \right) = (-1, 2)$$



Is the midsegment created by these midpoints parallel to $\overline{BC}$? $\rightarrow$ yes lines are ||.

	m of midsegment	m of BC
$m = \frac{y_2 - y_1}{x_2 - x_1}$	$m = \frac{4 - 2}{-5 - (-1)} = \frac{2}{-4} = -\frac{1}{2}$	$m = \frac{7 - 3}{-5 - 3} = \frac{4}{-8} = -\frac{1}{2}$

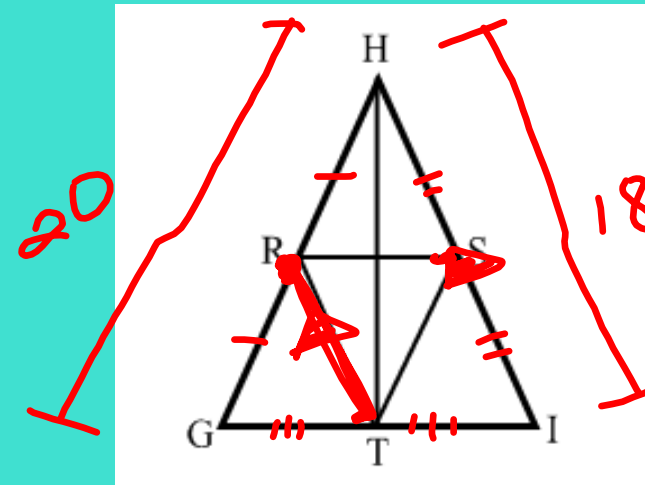
$\triangle GHI$, R, S, and T are midpoints.

If $GH = 20$ and $HI = 18$, find RT .

$$RT = \frac{1}{2}(HI)$$

$$RT = \frac{1}{2}(18)$$

$$RT = 9$$



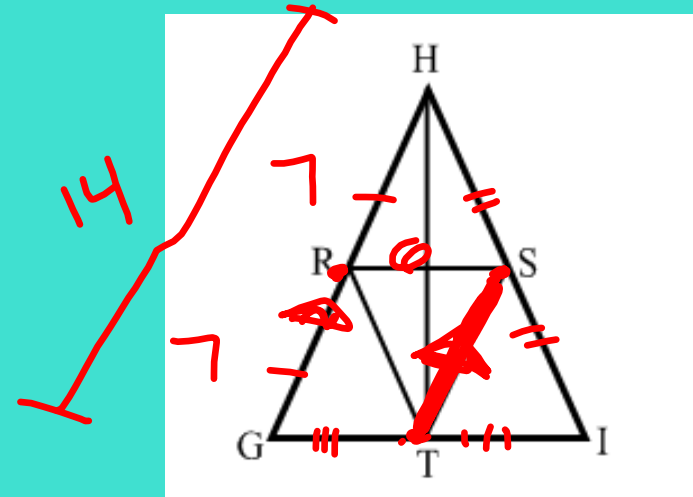
$\triangle GHI$, R, S, and T are midpoints.

If $RH = 7$ and $RS = 6$, find ST .

$$ST = \frac{1}{2} (HG)$$

$$ST = \frac{1}{2} (14)$$

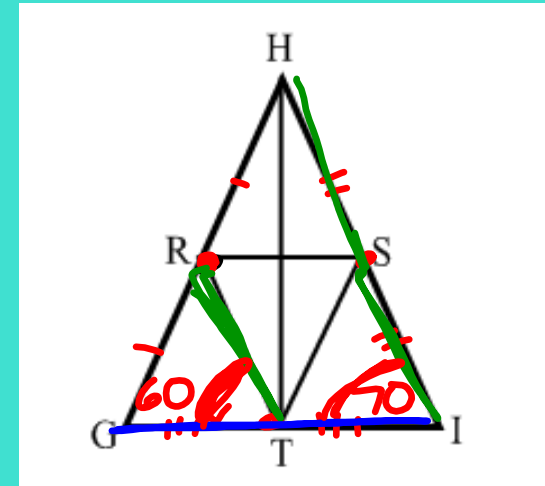
$$ST = 7$$



$\triangle GHI$, R, S, and T are midpoints.

If $m\angle G = 60$ and $m\angle I = 70$, find $m\angle GTR$.

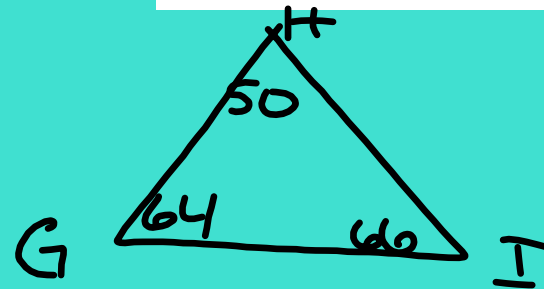
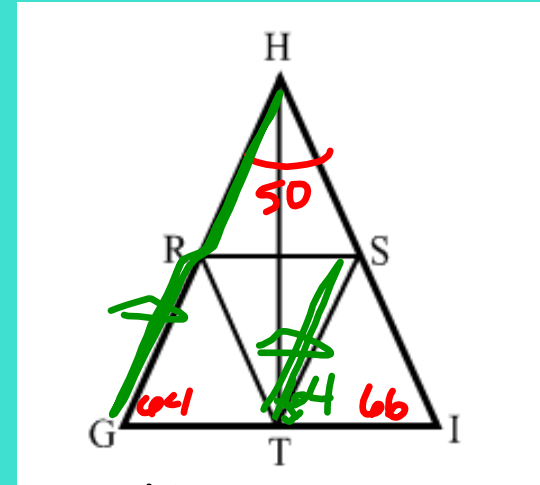
$$m\angle GTR = 70^\circ$$



$\triangle GHI$, R, S, and T are midpoints.

If $m\angle H = 50$ and $m\angle I = 66$,
find $m\angle ITS$.

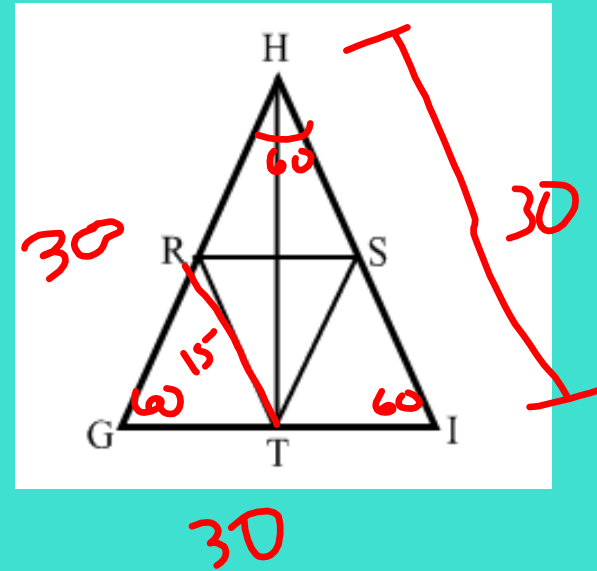
$$m\angle ITS = 64^\circ$$



$\triangle GHI$, R, S, and T are midpoints.

If $m\angle G = m\angle H = m\angle I$ and $RT = 15$,
find the perimeter of triangle GHI.

$\rightarrow 90$



Assignments:

Pgs 262-264 2-6 evens, 7-10 all, 13,14-16 evens,
20, 21a, 22, 24, 28,30-36