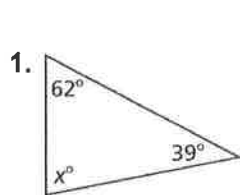


6.4 Triangle Midsegment Theorem

Bellwork

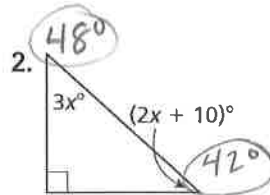
Find the measure of the unknown angle(s) in the triangle.



$$x = 180 - (62 + 39)$$

$$180 - 101$$

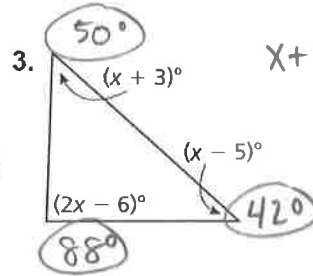
$$x = 79^\circ$$



$$3x + 2x + 10 = 90$$

$$5x = 80$$

$$x = 16$$



$$x + 3 + x - 5 + 2x - 6 = 180$$

$$4x - 8 = 180$$

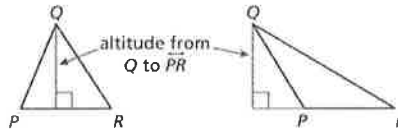
$$4x = 188$$

$$x = 47$$

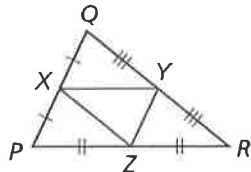
Objective

Prove and use properties of triangle midsegments.

An **altitude of a triangle** is the perpendicular segment from a vertex to the opposite side or to the line that contains the opposite side.



A **midsegment of a triangle** is a segment that joins the midpoints of two sides of the triangle. Every triangle has three midsegments, which form the *midsegment triangle*.

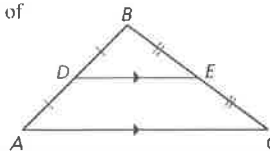


Midsegments: \overline{XY} , \overline{YZ} , \overline{ZX}
 Midsegment triangle: $\triangle XYZ$

Theorem 6.8 Triangle Midsegment Theorem

The segment connecting the midpoints of two sides of a triangle is parallel to the third side and is half as long as that side.

\overline{DE} is a midsegment of $\triangle ABC$. $\overline{DE} \parallel \overline{AC}$,
 and $DE = \frac{1}{2}AC$.

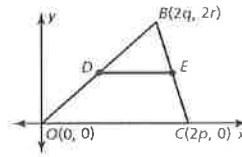


6.4 Triangle Midsegment Theorem.notebook

December 06, 2018

Write a coordinate proof of the Triangle Midsegment Theorem for one midsegment.

Given \overline{DE} is a midsegment of $\triangle OBC$.
Prove $\overline{DE} \parallel \overline{OC}$ and $DE = (1/2)OC$



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

$$DE = \sqrt{(p+q-q)^2 + (r-r)^2}$$

$$= \sqrt{(p)^2 + (0)^2}$$

$$= \sqrt{(p)^2}$$

$$DE = p$$

$D(q, r)$ $E(p+q, r)$

Slope of DE: $\frac{r - r}{p+q - q} = 0$

$m = \frac{0}{-p} = 0$

Slope of OC: $\frac{0 - 0}{2p - 0} = 0$

$\frac{0}{2p} = 0$

Same slope:
 $\overline{DE} \parallel \overline{OC}$

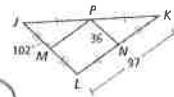
Find each measure.

JL $JL = 2(PN) = 2(36) = 72$

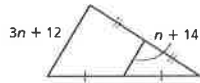
PM $PM = \frac{1}{2}(LK) = \frac{1}{2}(97) = 48.5$

$m\angle MLK$

$m\angle MLK = m\angle JMA = 102^\circ$



Find the value of n.

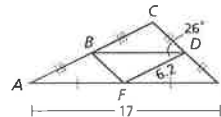


$2(n+14) = 3n+12$
 $2n+28 = 3n+12$
 $16 = n$

Find each measure.

BD $= \frac{1}{2}(17) = 8.5$

$m\angle CBD = 26^\circ$

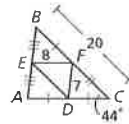


Use the diagram for Items 1-3. Find each measure.

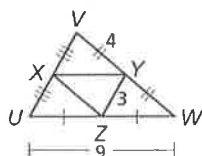
1. $ED = \frac{1}{2}(20) = 10$

2. $AB = 2(7) = 14$

3. $m\angle BFE = 44^\circ$



4. $\triangle XYZ$ is the midsegment triangle of $\triangle WUV$.
What is the perimeter of $\triangle XYZ$?



$XY = 4.5$

$XZ = 4$

$YZ = 3$

Perimeter $= 4.5 + 4 + 3 = 11.5$ units

Homework:
pg. 333 # 3,4, 7-21, 25