

Parallelogram - A quadrilateral with both pairs of opposite sides congruent and both pairs of opposite sides parallel.

$$\overline{WX} \parallel \overline{ZY}$$

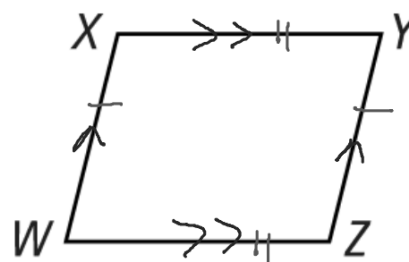
$$\overline{WZ} \parallel \overline{XY}$$

$$\overline{WX} \cong \overline{ZY}$$

$$\overline{WZ} \cong \overline{XY}$$

Name

\square WXYZ



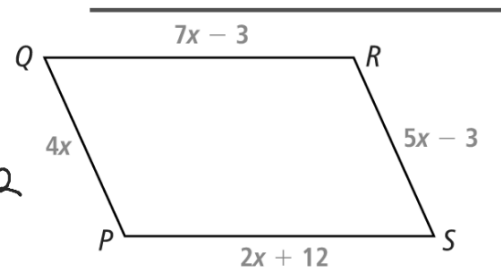
Quadrilateral $PQRS$ is a parallelogram.

A. What is the value of x ?

SOLUTION

$$\begin{aligned}4x &= 5x - 3 \\ -x &= -3 \\ x &= 3\end{aligned}$$

$$\begin{aligned}7x - 3 &= 2x + 12 \\ 5x - 3 &= 12 \\ 5x &= 15 \\ x &= 3\end{aligned}$$



B. What is the length of each side of $PQRS$?

$$\begin{aligned}PQ &= 4x = 4(3) = 12 \\ RS &= 12\end{aligned}$$

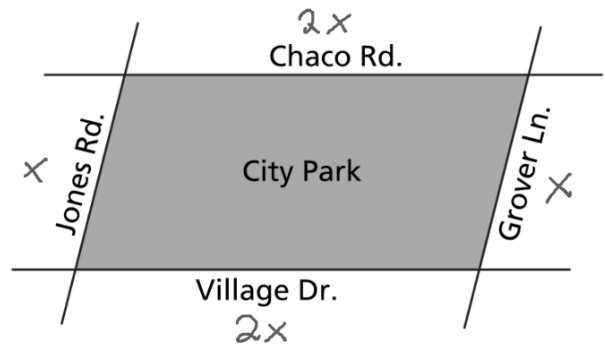
$$\begin{aligned}PS &= 2x + 12 = 2(3) + 12 \\ &= 6 + 12 = 18 \\ QR &= 18\end{aligned}$$

2. The 600-meter fence around City Park forms a parallelogram. The fence along Chaco Road is twice as long as the fence along Grover Lane. What is the length of the fence along Jones Road?

$$2x + 2x + x + x = 600$$

$$6x = 600$$

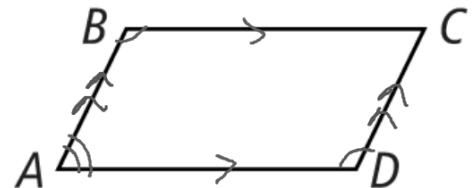
$$x = 100 \text{ m}$$



Parallelogram - A quadrilateral with consecutive pairs of angles supplementary.

If a quadrilateral is a parallelogram, then its consecutive angles are supplementary.

$$\overline{AB} \parallel \overline{DC}$$
$$\overline{AD} \parallel \overline{BC}$$



$$m\angle A + m\angle B = 180$$

$$m\angle B + m\angle C = 180$$

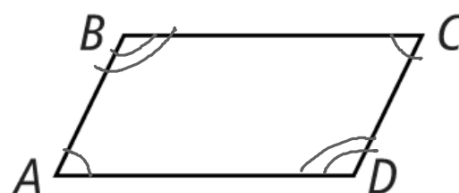
$$m\angle C + m\angle D = 180$$

$$m\angle D + m\angle A = 180$$

Parallelogram - A quadrilateral with both pairs of opposite angles congruent.

$$\overline{AB} \parallel \overline{DC}$$

$$\overline{AD} \parallel \overline{BC}$$



$$\angle A \cong \angle C$$

$$\angle B \cong \angle D$$

4. Use the parallelogram shown.

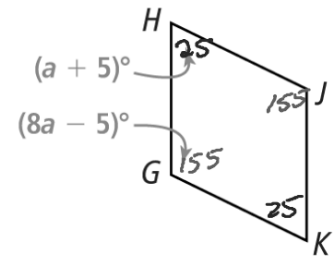
a. Given parallelogram $GHJK$, what is the value of a ?

$$m\angle H + m\angle G = 180$$

Enter $a + 5 + 8a - 5 = 180$

$$9a = 180$$

$$a = 20$$



b. What are $m\angle G$, $m\angle H$, $m\angle J$, and $m\angle K$?

$$m\angle G = 8a - 5 = 8(20) - 5 \\ = 155$$

$$m\angle H = a + 5 \\ = 25$$

$$m\angle J = 155$$

$$m\angle K = 25$$

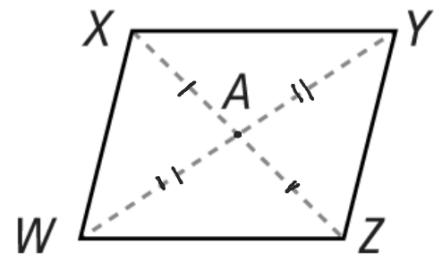
Parallelogram - A quadrilateral with both diagonals bisecting each other.

$$\overline{WX} \parallel \overline{ZY}$$

$$\overline{WZ} \parallel \overline{XY}$$

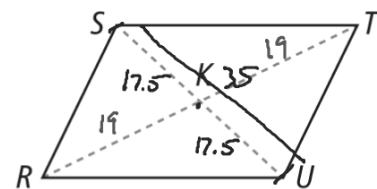
$$\overline{AW} \cong \overline{AY}$$

$$\overline{AX} \cong \overline{AZ}$$



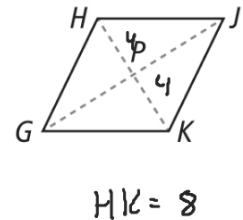
5. Use parallelogram $RSTU$ with $SU = 35$ and $KT = 19$.

a. What is SK ? = 17.5



b. What is RT ? = 38

6. Given parallelogram $GHJK$, if $PK = 4$ and $HK = \frac{2}{3}(GJ)$, what is GP ?



$$GP = 5.3$$

$$HK = \frac{2}{3}(GJ)$$

$$GJ = 12$$

$$HK = \frac{2}{3}(x)$$

$$GP = 6$$

$$3(8) = \left(\frac{2}{3}x\right)3$$

$$24 = 2x$$

$$x = 12$$

Use parallelogram $ABCD$ to find BC .

$$3x - 2 = x + 4$$

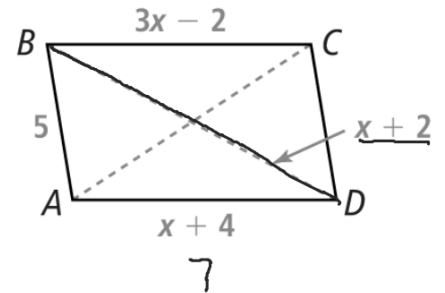
$$2x = 6$$

$$x = 3$$

$$\begin{aligned} BC &= 3(3) - 2 \\ &= 7 \end{aligned}$$

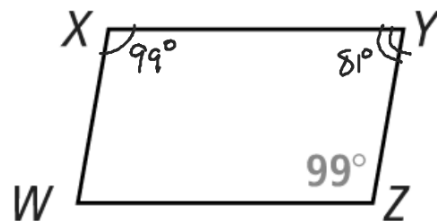
Use parallelogram $ABCD$ to find BD .

$$BD = 5$$



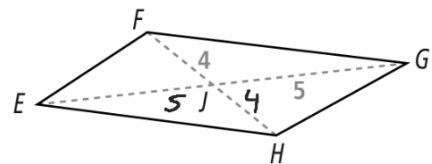
~~$$5^2 + 7^2 = BD^2$$~~

Use parallelogram $WXYZ$ to find $m\angle WXY$.



Use parallelogram $WXYZ$ to find $m\angle XYZ$.

Use parallelogram $EFGH$ to find EJ .



Use parallelogram $EFGH$ to find FH .

Use parallelogram $MNPQ$ to find $m\angle NPQ$.

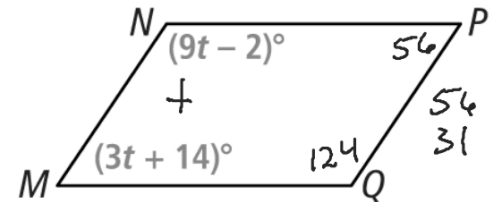
$$9t - 2 + 3t + 14 = 180$$

$$12t + 12 = 180$$

$$12t = 168$$

$$t = 14$$

Use parallelogram $MNPQ$ to find $m\angle PQM$.



$$3t + 14$$

$$3(14) + 14$$

$$56^\circ$$

