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

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

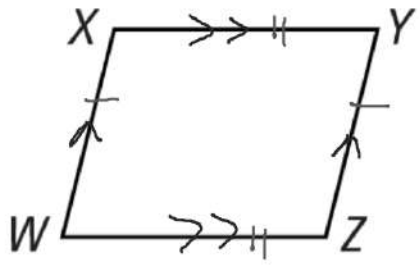
$\overline{WZ} \parallel \overline{XY}$

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

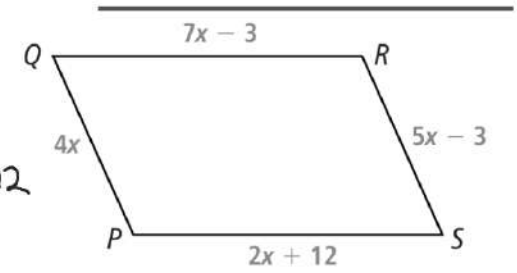
$\overline{WZ} \cong \overline{XY}$

Name

$\square WXYZ$



Quadrilateral *PQRS* is a parallelogram.



A. What is the value of *x*?

SOLUTION

$4x = 5x - 3$

$-x = -3$

$x = 3$

$7x - 3 = 2x + 12$

$5x - 3 = 12$

$5x = 15$

$x = 3$

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

$PQ = 4x = 4(3) = 12$

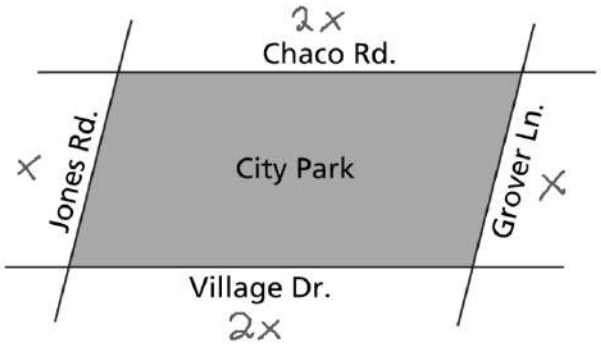
$RS = 12$

$PS = 2x + 12 = 2(3) + 12$

$= 6 + 12 = 18$

$QR = 18$

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?



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

$6x=600$

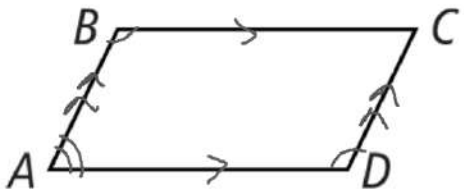
$x=100\ m$

Parallelogram - A quadrilateral with consecutive piars of angles supplementary.

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

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

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



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

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

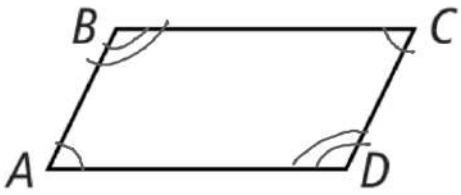
$m\angle C + m\angle D = 180$

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

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

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

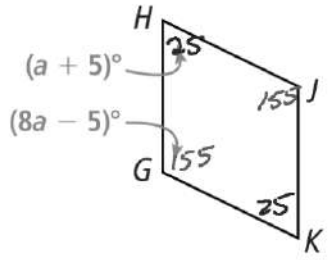
$\overline{AD} \parallel \overline{BC}$



$\angle A \cong \angle C$

$\angle B \cong \angle D$

4. Use the parallelogram shown.



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

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

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

$9a=180$

$a=20$

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

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

$=155$

$m\angle J = 155$

$m\angle H = a+5$

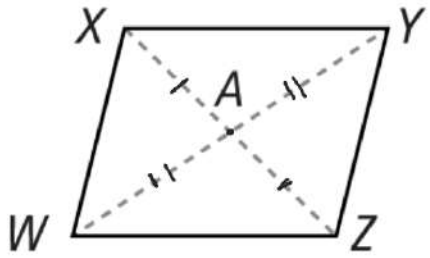
$=25$

$m\angle K = 25$

Parallelogram - A quadrilateral with both diagonals bisecting eachother.

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

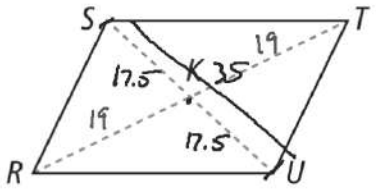
$\overline{WZ} \parallel \overline{XY}$



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

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

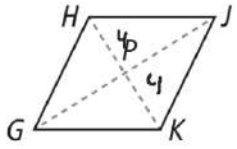
5. Use parallelogram *RSTU* with $SU = 35$ and $KT = 19$.



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*?



$HK = 8$

$GP = 5.3$

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

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

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

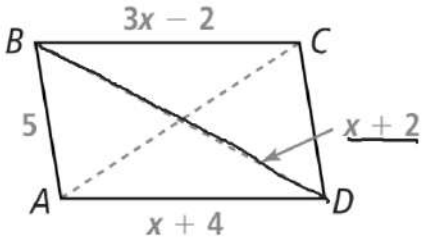
$24 = 2x$

$x = 12$

$GJ = 12$

$GP = 6$

Use parallelogram *ABCD* to find *BC*.



$3x-2 = x+4$

$2x = 6$

$x = 3$

$BC = 3(3)-2$

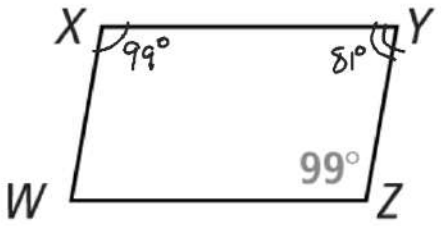
$= 7$

Use parallelogram *ABCD* to find *BD*.

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

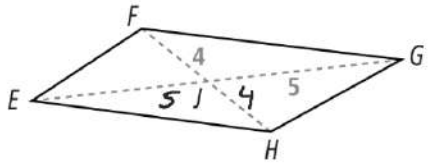
$BD = 5$

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*.

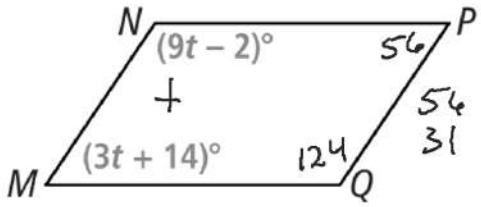
Use parallelogram *MNPQ* to find $m\angle NPQ$.

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

$12t+12=180$

$12t=168$

$t=14$



$3t+14$

$3(14)+14$

$56°$

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