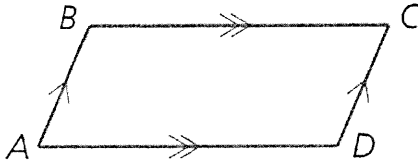


I. What is a Parallelogram?

A quadrilateral with two pairs of parallel sides is a parallelogram.

[square
rectangle
rhombus]

To write the name of a parallelogram, you use the symbol \square .



Parallelogram $ABCD$
 $\square ABCD$

$$\overline{AB} \parallel \overline{CD}, \overline{BC} \parallel \overline{DA}$$

II. Properties of Parallelograms

Theorem	Hypthesis	Conclusion
If a quadrilateral is a parallelogram, then its <u>opposite sides are congruent</u> .		$\overline{AB} \cong \overline{CD}$ $\overline{BC} \cong \overline{AD}$
If a quadrilateral is a parallelogram, then its <u>consecutive angles are opposite congruent</u> .		$m\angle A = m\angle C$ $\angle A \cong \angle C$ $m\angle B = m\angle D$ $\angle B \cong \angle D$
If a quadrilateral is a parallelogram, then its <u>consecutive angles are supplementary</u> .		$m\angle A + m\angle B = 180^\circ$ $m\angle B + m\angle C = 180^\circ$ $m\angle C + m\angle D = 180^\circ$ $m\angle D + m\angle A = 180^\circ$
If a quadrilateral is a parallelogram, then its <u>diagonals bisect each other</u> .		$\overline{BZ} \cong \overline{DZ}$ $\overline{AZ} \cong \overline{CZ}$

III. Using Properties of Parallelograms (to find side lengths and angle measurements.)

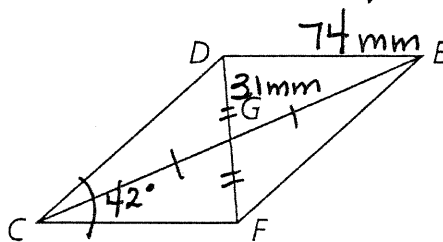
1.

In $\square CDEF$, $DE = 74$ mm,
 $DG = 31$ mm, and $m\angle FCD = 42^\circ$.

$$CF = 74 \text{ mm}$$

$$m\angle EFC = 138^\circ$$

$$DF = 62 \text{ mm}$$



2. WXYZ is a parallelogram.
 Find each measure. YZ and $m\angle Z$.

$$YZ = 6a + 10 = 8a - 4 \quad 8(7) - 4 = 52$$

$$10 = 2a - 4$$

$$14 = 2a$$

$$a = 7$$

$m\angle Z =$

$$18b - 11 + 9b + 2 = 180$$

$$27b - 9 = 180$$

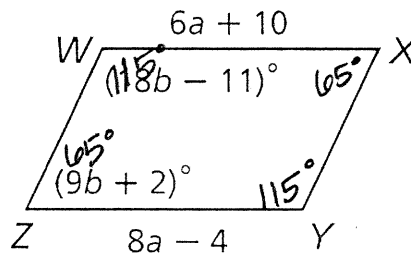
$$27b = 189$$

$$b = 7$$

$$m\angle Z = 9(7) + 2$$

$$m\angle Z = 63 + 2$$

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



3. Parallelograms in the Coordinate Plane

Three vertices of $\square JKLM$ are $J(3, -8)$, $K(-2, 2)$, and $L(2, 6)$.
 Find the coordinates of vertex M .

① Graph pts

② slope \overline{JK} : $m = \frac{2 - (-8)}{-2 - 3} = \frac{10}{-5} = -2 \checkmark$

③ start at $L \rightarrow$ go down 10, and to the right 5.

Label the point $M(7, -4)$

④ Verify slope of \overline{LM} : $m = \frac{6 - (-4)}{2 - 7}$

$$m = \frac{10}{-5} = -2 \checkmark$$

