

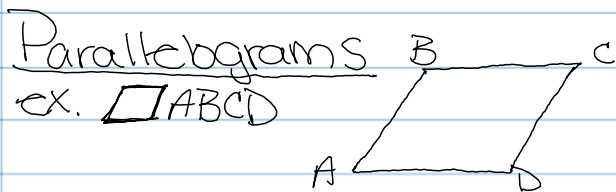
All Geometry

Quadrilateral - 4 sides polygon

Rectangle - polygon / quadrilateral with opposite sides are \cong , opposite angles are \cong , 4 \perp 's

Parallelogram - poly / quad 2 sets of parallel and \cong sides, opposite angles are \cong , consecutive angles are supplementary.

Diagonal - connects opposite angles



Opposite sides
 $\overline{BA} \cong \overline{CD}$
 $\overline{DA} \cong \overline{CB}$

Opposite angles
 $\angle A \cong \angle C$
 $\angle B \cong \angle D$

Theorems - opposite sides are \cong , opposite angle are \cong , diagonal bisects each other, consecutive \angle 's are \cong

Proof

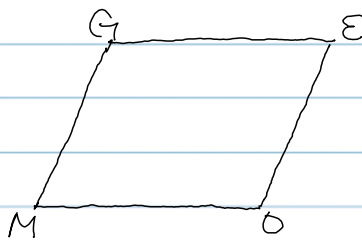
Given: $\square GEOM$

Prove: $\angle G + \angle E$ are supp.

$\angle E + \angle O$ are supp.

$\angle O + \angle M$ are supp.

$\angle M + \angle G$ are supp.



$\square GEOM$

GIVEN

$\overline{GE} \parallel \overline{MO}$

DEF OF \square

$\overline{GM} \parallel \overline{EO}$

$\angle G + \angle M$ are consec. int.

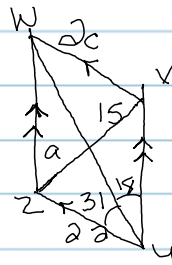
Supp.

are supp.

Given: $\square WXYZ$ $m\angle zwx = 10$
 $m\angle wxz = d$

Find a, b, c, d

$a=15$ $b=49$ $c=11$ $d=131$



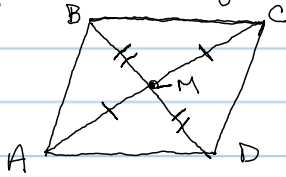
Al Geometry

Tests for a Parallelogram

- 1.) opposite sides of a parallelogram are \cong
Conv. IF opposite sides of a quadrilateral are \cong then it is a //ogram.
- 2.) ~~Both~~ IF both pairs of opposite angles of a quadrilateral are \cong then it is a //ogram.
- 3.) IF the diagonals of a quadrilateral bisect each other then it is a //ogram
- 4.) IF one pair of opposite sides is both // + \cong then the quadrilateral is a //ogram.

Alt Geometry

Parallelogram



$$\angle BAD \cong \angle BCD$$

$$\angle ADC \cong \angle ABC$$

Diagonals bisect each other

$$\overline{AM} \cong \overline{CM}$$

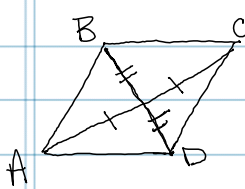
$$\overline{AB} \cong \overline{DC} \quad \overline{AB} \parallel \overline{DC}$$

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

$\angle BCD$ & $\angle CDA$ are supple.
 $\angle BAD + \angle ABC$ are supple
 $\angle ABC + \angle BCD$ are supple.
 $\angle CDA + \angle DAB$ are supple.

Consecutive are supple.

A quadrilateral is a parallelogram if any one of the following true:



1. Both pairs of opposite sides are parallel

$$\overline{AD} \parallel \overline{BC}, \quad \overline{BA} \parallel \overline{CD}$$

2. Both pairs of opposite sides are \cong .

$$\overline{AB} \cong \overline{DC}, \quad \overline{AD} \cong \overline{BC}$$

3. Both pairs of opposite \angle 's are \cong .

$$\angle ABC \cong \angle CDA, \quad \angle BAD \cong \angle BCD$$

4. Diagonals bisect each other

5. A pair of opposite sides are both \parallel & \cong

$A(3,4) \quad B(9,9) \quad C(17,9) \quad D(11,4)$

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

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

• both pairs of sides \cong

• both pairs of opp. sides are \parallel

• opp. \angle 's are \cong

• diagonals have same midpoint

$$d = \sqrt{(9-3)^2 + (9-4)^2}$$

$$\sqrt{36 + 25}$$

$$m = \left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$$

$$m \overline{BC} = \frac{9-9}{17-9} = \frac{0}{8} = 0$$

$$m \overline{AB} = \frac{9-4}{9-3} = \frac{5}{6}$$

$$m \overline{DC} = \frac{4-9}{11-17} = \frac{-5}{-6} = \frac{5}{6}$$

$$m \overline{AD} = \frac{4-4}{11-3} = \frac{0}{8} = 0$$

\overline{DC}

$$d = \sqrt{(11-17)^2 + (4-9)^2}$$

$$\sqrt{36 + 25}$$

