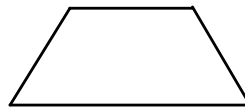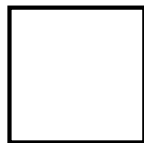3-3 Parallelograms

Notes: Pages 495-499
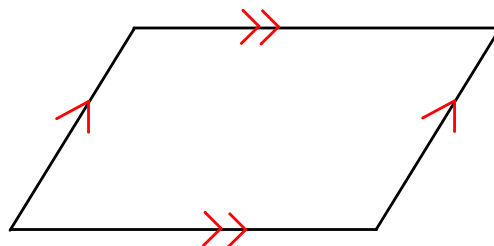

Definitions:

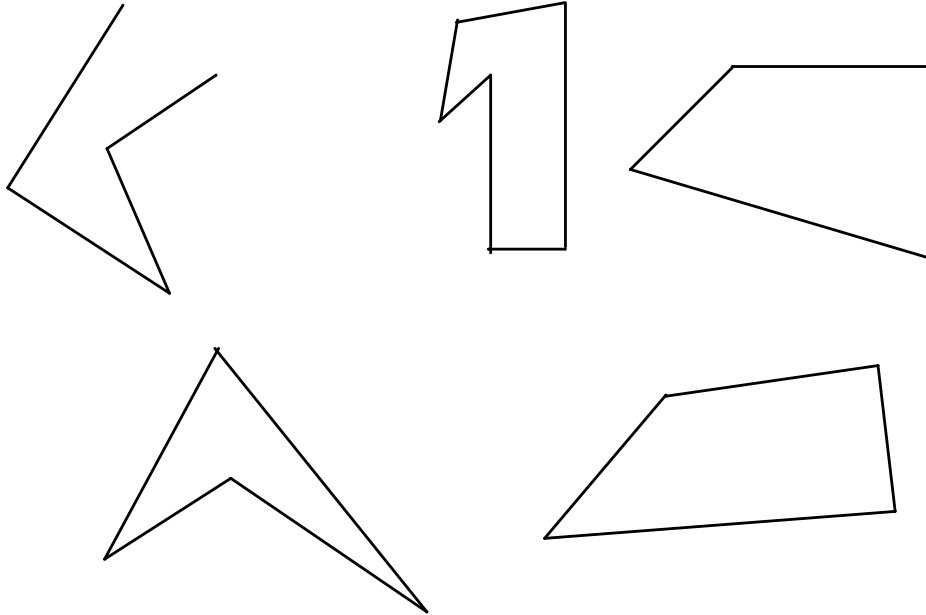Quadrilateral - A polygon with four vertices and four edges.

Woot Star Trek

Parallelogram - A quadrilateral with both pairs of opposite sides parallel.
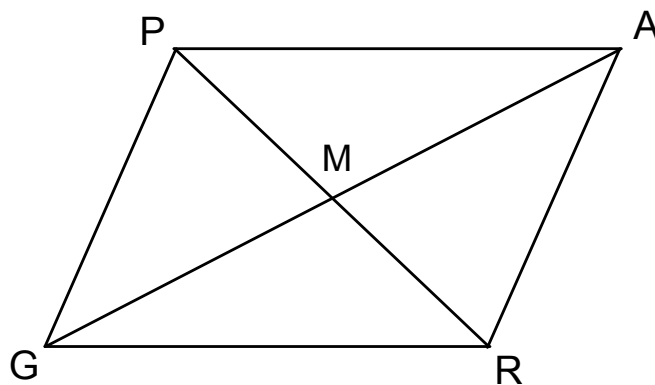
Which of the following are quadrilaterals?

P. 497 Q. 3

To prove opposite sides of a parallelogram *P* are congruent, which triangles would you prove congruent?
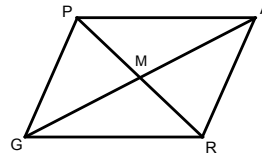
Use $\triangle PGR$ and $\triangle RAP$ in the parallelogram from Question 3 to prove that opposite sides of a parallelogram are congruent . Prove the statement $\overline{PG} \cong \overline{AR}$ and $\overline{GR} \cong \overline{PA}$.
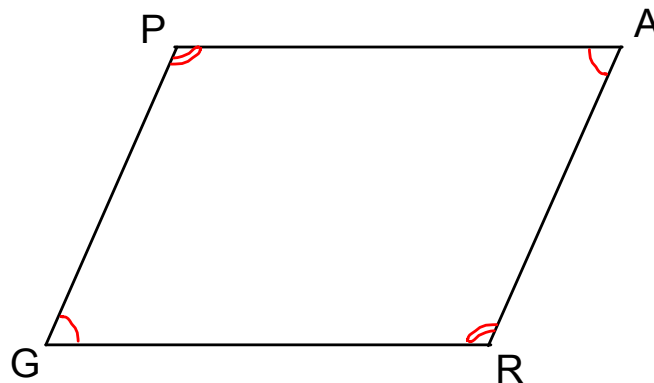
Given: Parallelogram $PARG$ with diagonals $\overline{PR}$ and $\overline{AG}$ intersecting at point M
Prove: $\overline{PG} \cong \overline{AR}$ and $\overline{GR} \cong \overline{PA}$

Another theorem states:

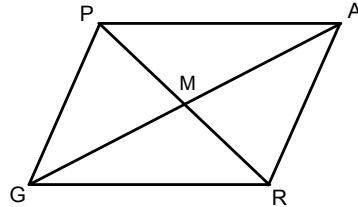Opposite angles of a parallelogram are congruent.

(You will prove this theorem in your homework.)

Groups: P. 499 Q. 8

Given: Parallelogram $PARG$ with diagonals $\overline{PR}$ and $\overline{AG}$ intersecting at point M
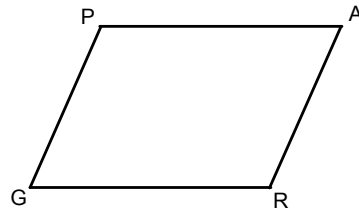
Prove: $\overline{PM} \cong \overline{RM}$
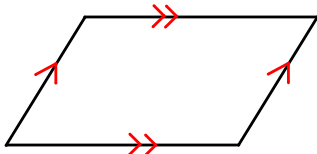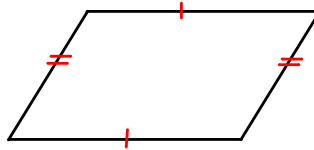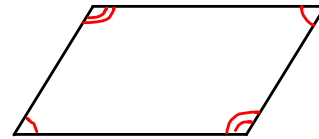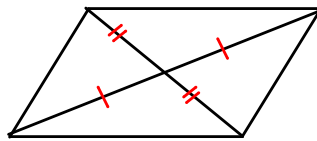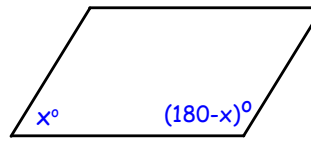

This theorem takes 2 seconds to prove 🙂

Given: PARG is a parallelogram

Prove: $m\angle PGR + m\angle GRA = 180°$

Recap: The 5 things we know about Parallelograms

In a parallelogram...

Opposite sides
are parallel

Opposite sides
are congruent

Opposite angles
are congruent

Diagonals bisect
each other

Consecutive angles
are supplementary

$x°$ $(180-x)°$
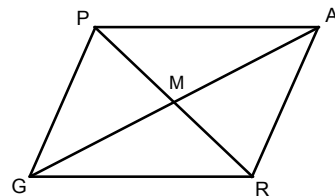

Find the value of each variable in the parallelogram.

$3y-7$

$5x$

$3x+18$

$2y+4$

Find the value of each variable in the parallelogram.

$4y°$ $(3x-18)°$

$(2x+12)°$ $3z°$
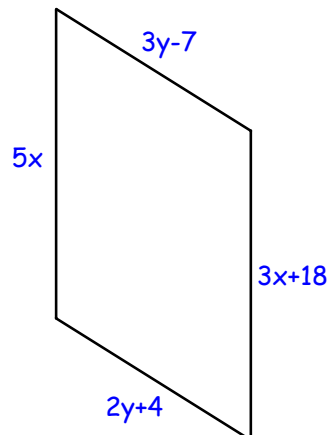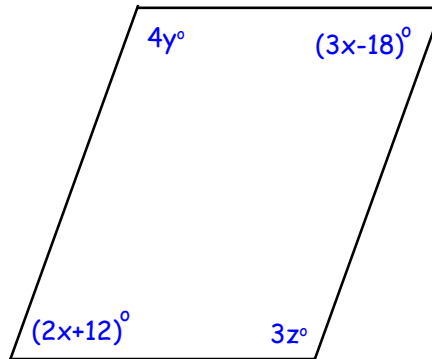
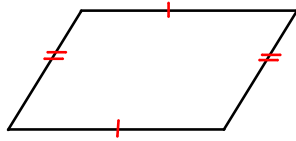
Ray told his math teacher that he thinks a quadrilateral is a parallelogram if only one pair of opposite sides is known to be both congruent and parallel .
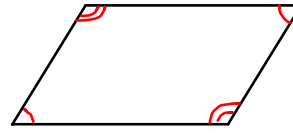
Is Ray Correct? Prove or disprove.
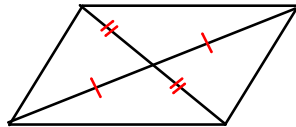
P   A

M

G   R

There are other converse theorems to prove that a quadrilateral is a parallelogram. We don't have time to prove them all. You will do one of them in your homework.
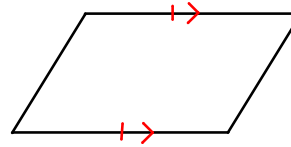
If opposite sides
are congruent...

If opposite angles
are congruent...

If the angles
bisect each other...

If opposite sides are
congruent and parallel...

...then the quadrilateral is a parallelogram.

Are you given enough information to determine whether the quadrilateral is a parallelogram? (Remember what it is labeled is more important then what it looks like.)