

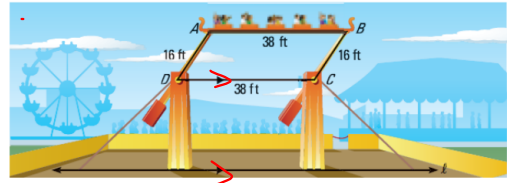
Geometry

9.2 Show a Quadrilateral is a Parallelogram

Ways to Prove a Quadrilateral is a Parallelogram

- | | |
|---|--|
| 1. Show both pairs of opposite sides are parallel.
<i>(DEFINITION)</i> | |
| 2. Show both pairs of opposite sides are congruent. | |
| 3. Show both pairs of opposite angles are congruent. | |
| 4. Show one pair of opposite sides are congruent and parallel. | |
| 5. Show the diagonals bisect each other. | |

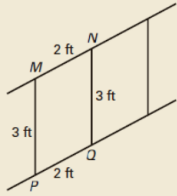
RIDE An amusement park ride has a moving platform attached to four swinging arms. The platform swings back and forth, higher and higher, until it goes over the top and around in a circular motion. In the diagram below, \overline{AD} and \overline{BC} represent two of the swinging arms, and \overline{DC} is parallel to the ground (line ℓ). Explain why the moving platform \overline{AB} is always parallel to the ground.



$ABCD$ is a \parallel -ogram b/c both prs of opp. sides are \cong .

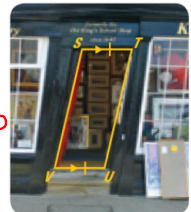
So by the Transitive Prop. of Parallel Lines \overline{AB} is parallel to the ground

The figure shows part of a stair railing. Explain how you know the support bars \overline{MP} and \overline{NQ} are parallel.



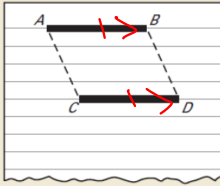
B/c both pairs of opp sides are \cong its a \parallel -ogram so by definition $\overline{MP} \parallel \overline{NQ}$

ARCHITECTURE The doorway shown is part of a building in England. Over time, the building has leaned sideways. Explain how you know that $SV = TU$.



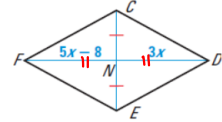
Since one pr of sides is \cong & \parallel its a \parallel -ogram which means opp sides are \cong
If $\overline{SV} \cong \overline{TU}$ then $SV = TU$ by def of \cong .

Suppose you place two straight, narrow strips of paper of equal length on top of two lines of a sheet of notebook paper. If you draw a segment to join their left ends and a segment to join their right ends, will the resulting figure be a parallelogram? Explain.



yes, b/c one pair of opp sides are \cong & \parallel

ALGEBRA For what value of x is quadrilateral $CDEF$ a parallelogram?



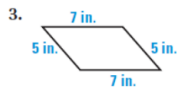
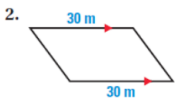
$$5x - 8 = 3x$$

$$-5x \quad -5x$$

$$\frac{-8}{-2} = \frac{-2x}{-2}$$

$$4 = x$$

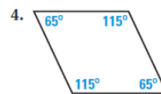
What theorem can you use to show that the quadrilateral is a parallelogram?



One pair of opp. sides are \cong & \parallel

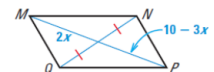
Both pairs of opp. sides are \cong

What theorem can you use to show that the quadrilateral is a parallelogram?



Both pairs of opp. \angle 's are \cong

5. For what value of x is quadrilateral $MNPQ$ a parallelogram? Explain your reasoning.



$$2x = 10 - 3x$$

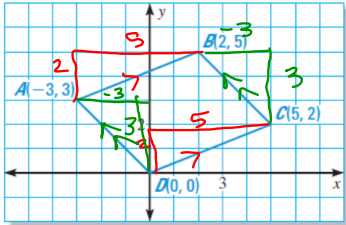
$$+3x \quad +3x$$

$$5x = 10$$

$$x = 2$$

Diagonals bisect each other

Show that quadrilateral $ABCD$ is a parallelogram.



11-ogram b/c opp sides are parallel (same slope)

Homework

Worksheet