

**Welding
Squaring Material Worksheet**

Name KEY

1. What type of quadrilateral has diagonals congruent?

Rectangle (and Square)

2. Two consecutive angles of a quadrilateral are right angles, but the quadrilateral is not a rectangle. Can the quadrilateral be a parallelogram? Explain.

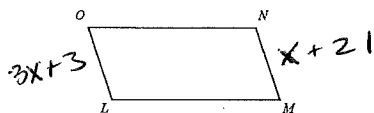


No, parallelograms have opposite angles congruent. This would mean the other two angles would have to be right angles too, which

3. Explain how you can determine, without measuring any angles, whether a quadrilateral is a rectangle? would make it a rectangle

Measure diagonals to see if they are congruent

4. $LMNO$ is a parallelogram. If $NM = x + 21$ and $OL = 3x + 3$ find the value of x and then find NM and OL .



$$\begin{array}{r} 3x+3 = x+21 \\ -x \quad -x \\ \hline 2x+3 = 21 \end{array}$$

$$\begin{array}{r} 2x+3 = 21 \\ -3 \quad -3 \\ \hline 2x = 18 \end{array}$$

$$\frac{2x}{2} = \frac{18}{2}$$

$$x = 9$$

$$\begin{array}{l} \overline{NM} = x+21 = 9+21 = 30 \\ \overline{OL} = 3(x)+3 = 3(9)+3 = 30 \end{array}$$

- a. $x = 9$, $NM = 32$, $OL = 30$
b. $x = 11$, $NM = 30$, $OL = 32$

c. c.

- $x = 9$, $NM = 30$, $OL = 30$
d. $x = 11$, $NM = 32$, $OL = 32$

5. $DEFG$ is a rectangle. $DF = 4x - 1$ and $EG = x + 29$. Find the value of x and the length of each diagonal.



$$\begin{array}{r} 4x-1 = x+29 \\ -x \quad -x \\ \hline 3x-1 = 29 \end{array}$$

$$\begin{array}{r} 3x-1 = 29 \\ 3x = 30 \end{array}$$

$$x = 10$$

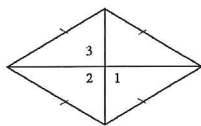
$$\overline{DF} = 4(10)-1 = 39$$

$$\overline{EG} = 10+29 = 39 \checkmark$$

- a. a. $x = 10$, $DF = 39$, $EG = 41$
b. $x = 10$, $DF = 39$, $EG = 39$

- c. $x = 5$, $DF = 34$, $EG = 34$
d. $x = 10$, $DF = 34$, $EG = 34$

6. In the rhombus, $m\angle 1 = 10x$, $m\angle 2 = x + y$, $m\angle 3 = 2z$. Find the value of each variable. The diagram is not to scale.



$$m\angle 1 = 90^\circ \quad m\angle 2 = 90^\circ$$

$$10x = 90$$

$$x = 9$$

$$x + y = 90$$

$$9 + y = 90$$

$$y = 81$$

$$m\angle 3 = 2z$$

$$90 = 2z$$

$$45 = z$$

a. $x = 9, y = 171, z = 90$

b. $x = 18, y = 81, z = 90$

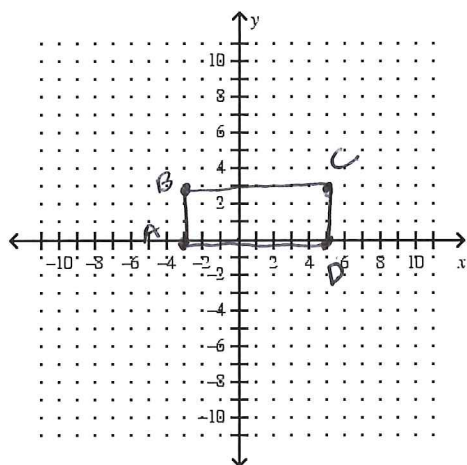
c.

$x = 9, y = 81, z = 45$

d.

$x = 18, y = 171, z = 45$

7. Prove that quadrilateral ABCD with A(-3, 0), B(-3, 3), C(5, 3), and D(5, 0) is a rectangle. Show work.



$$m_{AB} = \frac{3-0}{-3-(-3)} = \frac{3}{0} \text{ undefined}$$

$$m_{CD} = \frac{0-3}{5-5} = \frac{-3}{0} = \text{undefined}$$

vertical lines have an undefined slope - vertical lines are //

$$\overline{AB} \parallel \overline{CD}$$

$$m_{BC} = \frac{3-3}{5-(-3)} = \frac{0}{8} = 0$$

$$m_{AD} = \frac{0-0}{5-(-3)} = \frac{0}{8} = 0$$

Horizontal lines have a slope of "zero"

Horizontal lines are //

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

Vertical lines are \perp to Horizontal lines so:

$$\overline{AB} \perp \overline{BC}, \quad \overline{BC} \perp \overline{CD}$$

$$\overline{AB} \perp \overline{AD}, \quad \overline{CD} \perp \overline{AD}$$

Perpendicular lines form right (90°) angles.

ABCD has 4 right \angle 's
opposite sides parallel
opposite sides congruent
so ABCD is a rectangle