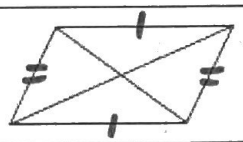
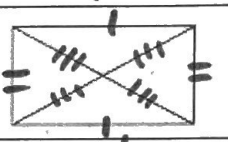
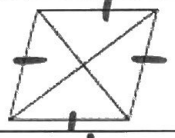
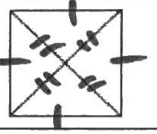
5.6 Notes

Name: Key

coordinate geometry: Name that Quadrilateral!

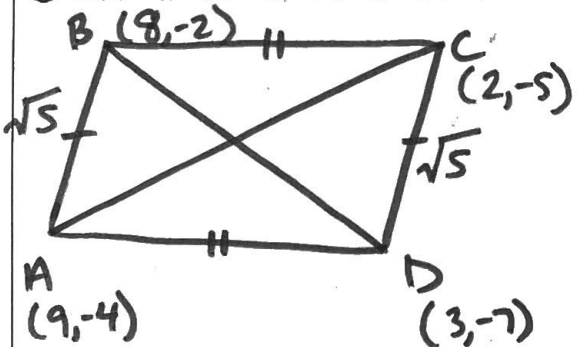
To classify a quadrilateral as a parallelogram, rectangle, rhombus, or square, use the following steps:

- ✓ **Step 1:** Check congruency of Sides.
- ✓ **Step 2:** Check congruency of diagonals.

CASE 1 (Parallelogram)	opp. sides are ≅ & diagonals are not ≅	
CASE 2 (Rectangle)	opp. sides are ≅ & diagonals are ≅	
CASE 3 (Rhombus)	All 4 sides are ≅ & diagonals are not ≅	
CASE 4 (Square)	All 4 sides are ≅ & diagonals are ≅.	

Practice! Given the vertices, determine the quadrilaterals most specific classification.

❶ $A(9, -4)$, $B(8, -2)$, $C(2, -5)$, $D(3, -7)$



TO classify, use distance Formula on all the sides & diagonals.

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

$\overline{AB}: \sqrt{(9-8)^2+(-4+2)^2} = \sqrt{1+4} = \sqrt{5}$

$\overline{CD}: \sqrt{(3-2)^2+(-7+5)^2} = \sqrt{1+4} = \sqrt{5}$

$\overline{BC}: \sqrt{(2-8)^2+(-5+2)^2} = \sqrt{36+9} = \sqrt{45}$

$\overline{AD}: \sqrt{(3-9)^2+(-7+4)^2} = \sqrt{36+9} = \sqrt{45}$

$\overline{BD}: \sqrt{(3-8)^2+(-7+2)^2}$

$\sqrt{25+25} = \sqrt{50}$

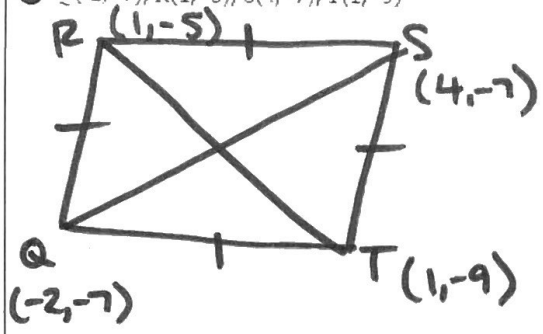
$\overline{AC}: \sqrt{(9-2)^2+(-4+5)^2} =$

$\sqrt{49+1} = \sqrt{50}$

$ABCD$ is a Rectangle.

Name: _____

2 $Q(-2, -7)$, $R(1, -5)$, $S(4, -7)$, $T(1, -9)$



$\overline{RT}: \sqrt{(1-1)^2+(-9+5)^2} = \sqrt{16} = 4$

$\overline{QS}: \sqrt{(-2-4)^2+(-7+7)^2} = \sqrt{36} = 6$

$\overline{QR}: \sqrt{(-2-1)^2+(-7+5)^2} = \sqrt{13}$

$\overline{ST}: \sqrt{(1-4)^2+(-9+7)^2} = \sqrt{13}$

$\overline{RS}: \sqrt{(4-1)^2+(-7+5)^2} = \sqrt{13}$

$\overline{QT}: \sqrt{(1+2)^2+(-9+7)^2} = \sqrt{13}$

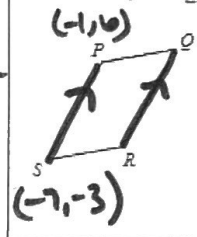
$QRST$ is a Rhombus.

QUADRILATERALS *in the* COORDINATE PLANE

Directions: Use your knowledge of slope, distance, midpoint, and the properties of quadrilaterals to answer the following questions.

1. On parallelogram $PQRS$ below, if P is located at (-1, 6) and S is located at (-7, -3), what is the slope of $\overline{QR}$?

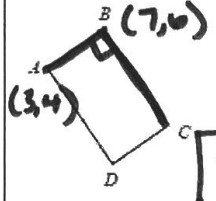
* $\frac{y_2-y_1}{x_2-x_1}$



$\frac{-3-6}{-7+1} = \frac{-9}{-6} =$ $\boxed{\frac{3}{2}}$

2. On rectangle $ABCD$ below, if A is located at (3, 4) and B is located at (7, 6), is the slope of $\overline{BC}$?

* Opposite reciprocal

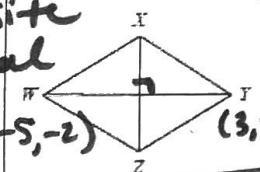


$\overline{AB}: \frac{6-4}{7-3} = \frac{2}{4} = \frac{1}{2}$

$\overline{BC}: -\frac{2}{1}$ or -2

3. On rhombus $WXYZ$, if W is located at (-5, -2) and Y is located at (3, -2), what is the slope of $\overline{XZ}$?

* opposite reciprocal

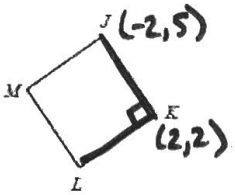


Slope of $\overline{WY}: \frac{-2+2}{3+5} = \frac{0}{8} = \boxed{0}$

Slope of $\overline{XZ}$: undef

4. On square $JKLM$ below, if J is located at (-2, 5) and K is located at (2, 2), what is the slope of $\overline{LK}$?

* Opp. reciprocal

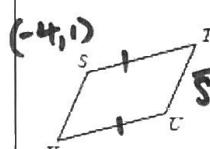


Slope of $\overline{JK}: \frac{2-5}{2+2} = \frac{-3}{4}$

Slope of $\overline{LK}: \frac{4}{3}$

5. On parallelogram $STUV$ below, if S is located at (-4, 1) and T is located at (5, 3), what is the length of $\overline{TU}$?

distance Formula:



$\overline{ST}: \sqrt{(5+4)^2+(3-1)^2}$

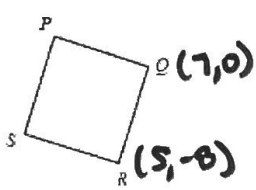
$\sqrt{81+4} =$

$\overline{TU} = \sqrt{85}$

* opp. sides ≅.

6. On square $PQRS$ below, if Q is located at (7, 0) and R is located at (5, -8), what is the length of $\overline{SR}$?

* distance Formula



$\overline{QR}: \sqrt{(5-7)^2+(-8-0)^2}$

$\sqrt{4+64} =$

$\overline{SR}: \sqrt{68}$