

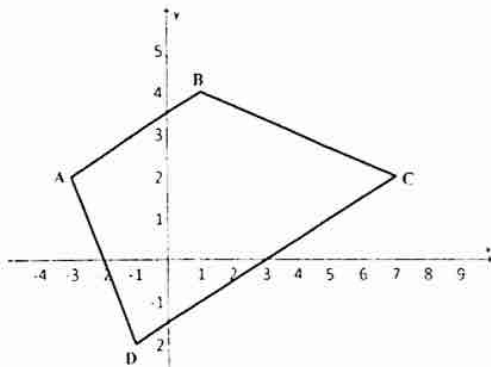
Name: _____

Date: _____

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Key

Use the graph of quadrilateral ABCD and the characteristics identified in the accompanying table to answer #s 1 and 2.
NOTE: The math has been done and the results are displayed in the table – base your justifications off of the information in the table.



| Sides | Slopes | Distances |
|-------|----------------|--------------|
| AB | $\frac{1}{2}$ | $2\sqrt{5}$ |
| BC | $-\frac{1}{3}$ | $2\sqrt{10}$ |
| CD | $\frac{1}{2}$ | $4\sqrt{5}$ |
| DA | -2 | $2\sqrt{5}$ |

1. Statement: One pair of sides is parallel.

True or False?

True
+1

Justification:

\overline{AB} & \overline{CD} have the
SAME SLOPE

+1

2. Use the information in the table to complete the statements below.

a. Side \overline{AB} is congruent to side \overline{DA} since the same distances

+1

+1

b. Side \overline{AB} is perpendicular to side \overline{DA} since opposite reciprocal slopes

+1

+1

3. Quadrilateral MNOP has vertices as follows $M(-1, 8)$, $N(5, 10)$, $O(3, 6)$, $P(-3, 4)$. Do the diagonals, MO and NP, bisect each other? Perform the appropriate calculations and an answer supported by those calculations.

MATH/CALCULATIONS: $MO: \left(\frac{-1+3}{2}, \frac{8+6}{2} \right) = (1, 7)$

+1

$NP: \left(\frac{5-3}{2}, \frac{10+4}{2} \right) = \left(\frac{2}{2}, \frac{14}{2} \right) = (1, 7)$

Answer:

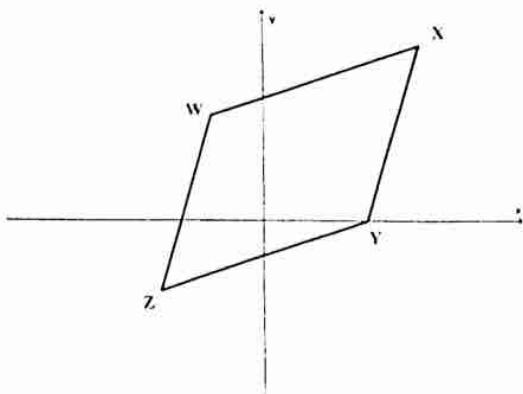
yes, because their midpoints are the same.

(Yes or No?)

+1

+8

4. Quadrilateral WXYZ is graphed below. Characteristics are provided in the accompanying table. Hint: Label your picture with the given slopes and distances first.



| Segment | Slope | Distance |
|---------|---------------|-------------|
| WX | $\frac{1}{2}$ | $2\sqrt{5}$ |
| XY | 5 | $\sqrt{26}$ |
| YZ | $\frac{1}{2}$ | $2\sqrt{5}$ |
| WZ | 5 | $\sqrt{26}$ |
| WY | -1 | $3\sqrt{2}$ |
| XZ | $\frac{7}{5}$ | $\sqrt{74}$ |

a. Place a check (\checkmark) in the box of any property that is true and then provide a justification.

| True? | Property | Justification |
|-------------------------------------|------------------------------|-------------------------|
| <input checked="" type="checkbox"/> | Opposite sides are parallel | same slope +1 |
| <input checked="" type="checkbox"/> | Opposite sides are congruent | same distance/length +1 |
| <input type="checkbox"/> | All sides are congruent | |
| <input type="checkbox"/> | Four right angles | |
| <input checked="" type="checkbox"/> | Diagonals bisect each other | same midpoint |
| <input type="checkbox"/> | Diagonals are congruent | |
| <input type="checkbox"/> | Diagonals are perpendicular | |

+1

b. According to the properties proven above, Quadrilateral WXYZ is classified as a parallelogram.
+1

+4

5. **Multiple Choice** Which two properties would prove that a parallelogram is best classified as a square?

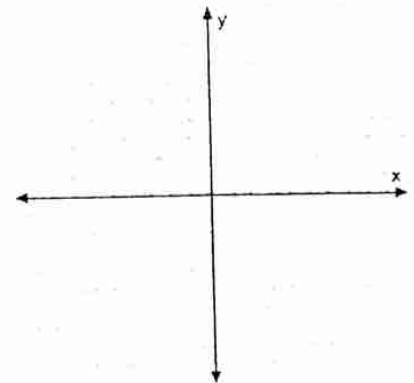
- A. Diagonals bisect each other; Diagonals are congruent
- B. Diagonals are congruent; Diagonals are perpendicular
- C. All sides are congruent; Diagonals bisect each other
- D. Opposite sides are congruent; Four Right Angles

ANSWER: B + 1

6. The vertices of a triangle are P(5, -2), Q(0, 6), and R(0, -2). A grid has been provided for convenience.

a. Complete the table. All work must be shown, if necessary.

| Sides | | |
|-----------------|-------------|-------------------------|
| Name | Distance | Slope |
| \overline{PQ} | $\sqrt{89}$ | $-\frac{8}{5}$ |
| \overline{QR} | 8 | $\frac{0}{0}$ undefined |
| \overline{RP} | 5 | $\frac{0}{-5} = 0$ zero |



$$PQ = d = \sqrt{(5-0)^2 + (-2-6)^2} = \sqrt{5^2 + (-8)^2} = \sqrt{25+64} = \sqrt{89}$$

$$\frac{6+2}{0-5} = \frac{8}{-5} = -\frac{8}{5}$$

$$QR = d = \sqrt{(0-0)^2 + (6+2)^2} = \sqrt{0 + 8^2} = \sqrt{64} = 8$$

$$\frac{-2-6}{0-0} = \frac{-8}{0} = \text{undefined}$$

$$RP = d = \sqrt{(0-5)^2 + (-2+2)^2} = \sqrt{(-5)^2 + (0)^2} = \sqrt{25} = 5$$

$$\frac{-2+2}{0-5} = \frac{0}{-5} = 0$$

b. Complete the statement:

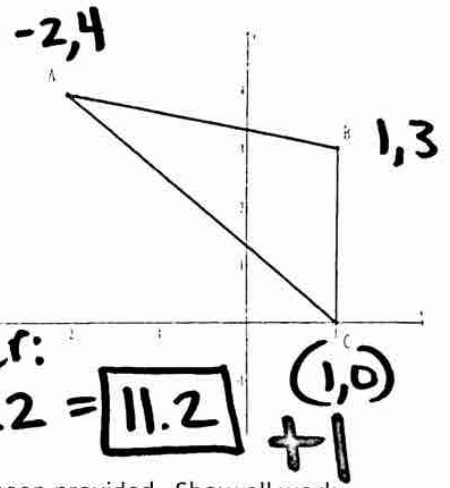
Based on side lengths, this triangle is classified as Scalene because all sides have different lengths.

c. Is the triangle a right triangle?

yes, because \overline{QR} & \overline{RP} have opposite reciprocal slopes, meaning they are perpendicular.

+6

7. Find the perimeter of the triangle graphed to the right. Show all work.



Perimeter = _____

$$AB = d = \sqrt{\frac{(1+2)^2 + (3-4)^2}{3^2 + (-1)^2}} = \sqrt{10} = 3.2$$

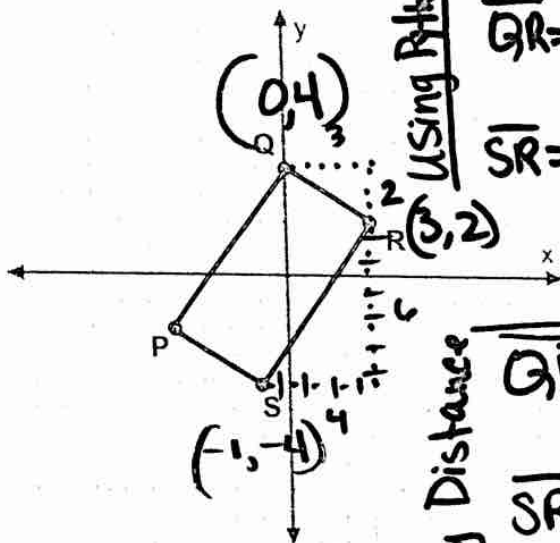
$$BC = \sqrt{\frac{(1-1)^2 + (3-0)^2}{0 + 9}} = \sqrt{9} = 3$$

$$CA = \sqrt{\frac{(1+2)^2 + (0-4)^2}{16 + 16}} = \sqrt{25} = 5$$

Perimeter:
 $3 + 5 + 3.2 = \boxed{11.2} + 1$

8. Find the area of each shape rounded to nearest hundredth, its classification has been provided. Show all work.

a. Rectangle



Area = bh

Using Pythag.
 $\overline{QR} = 2^2 + 3^2 = 4 + 9 = c^2$
 $13 = c^2 \quad c = 3.6$

$\overline{SR} = 4^2 + 6^2 = c^2$
 $16 + 36 = c^2$
 $52 = c^2 \quad c = 7.2$

$7.2 \times 3.6 = \boxed{25.92}$

Using Distance

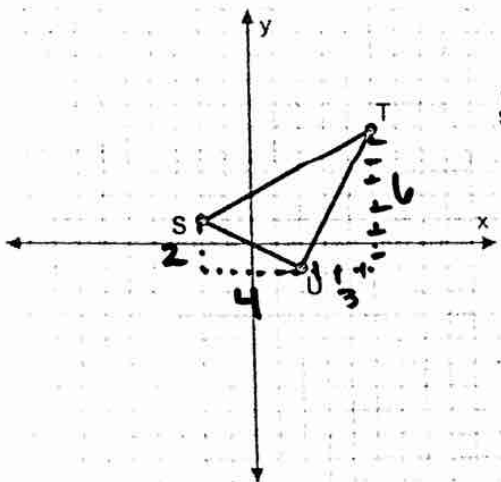
$\overline{QR} = \sqrt{(3-0)^2 + (2-4)^2} = \sqrt{9+4} = \sqrt{13} = 3.6$

$\overline{SR} = \sqrt{(3+1)^2 + (2+4)^2} = \sqrt{16+36} = \sqrt{52} = 7.2$

$3.6 \times 7.2 = \boxed{25.92} + 1$

Area = _____

b. Right Triangle Hint: Determine which sides make the height and base before using the area formula



$A = \frac{1}{2} b h$

* b is \perp to h, so \overline{SU} is base + \overline{TU} is height

$\overline{UT} = 3^2 + 6^2 = c^2 = 9 + 36 = c^2 \quad 45 = c^2$
 $c = 6.7$

$\overline{SU} = 2^2 + 4^2 = c^2 = 4 + 16 = 20 \quad c^2 = 20$
 $c = 4.5$

$\frac{1}{2} \cdot 6.7 \times 4.5$

Area = $\underline{15.075} + 1$

+3

a. Complete the tables. Show all math in the space provided beside the tables.

| Sides | | |
|-----------------|----------|----------------|
| Name | Distance | Slope |
| \overline{AB} | 5 | 0 |
| \overline{BC} | 5 | $-\frac{3}{4}$ |
| \overline{CD} | 5 | 0 |
| \overline{DA} | 5 | $-\frac{3}{4}$ |

+1 +1

$$AB = \sqrt{(8-3)^2 + (2-2)^2} = \sqrt{25}$$

$$5^2 + 0^2$$

$$BC = \sqrt{(8-4)^2 + (2-5)^2} = \sqrt{25}$$

$$4^2 + 3^2$$

$$CD = \sqrt{(4+1)^2 + (5-5)^2} = \sqrt{25}$$

$$5^2 + 0^2$$

$$DA = \sqrt{(3+1)^2 + (2-5)^2} = \sqrt{25}$$

$$4^2 + (-3)^2$$

$$\frac{2-2}{8-3} = \frac{0}{5} = 0$$

$$\frac{5-2}{4-8} = \frac{3}{-4} = -\frac{3}{4}$$

$$\frac{5-5}{-1-4} = \frac{0}{-5} = 0$$

$$\frac{5-2}{-1-3} = \frac{3}{-4} = -\frac{3}{4}$$

| Diagonals | | | |
|-----------------|-------------|----------------|------------------------------|
| Name | Distance | Slope | Midpoint |
| \overline{AC} | $\sqrt{10}$ | 3 | $(\frac{7}{2}, \frac{7}{2})$ |
| \overline{BD} | $\sqrt{40}$ | $-\frac{1}{3}$ | $(\frac{7}{2}, \frac{7}{2})$ |

+1 +1 +1

$$\overline{AC} = d = \sqrt{(4-3)^2 + (5-2)^2} = \sqrt{10}$$

$$1^2 + 3^2$$

$$\overline{BD} = d = \sqrt{(8+1)^2 + (2-5)^2} = \sqrt{40}$$

$$8^2 + 9$$

$$\frac{5-2}{4-3} = 3 \quad \left(\frac{3+4}{2}, \frac{2+5}{2} \right) = \left(\frac{7}{2}, \frac{7}{2} \right)$$

$$\frac{5-2}{-1-8} = \frac{3}{-9} = -\frac{1}{3} \quad \left(\frac{8-1}{2}, \frac{2+5}{2} \right) = \left(\frac{7}{2}, \frac{7}{2} \right)$$

b. Place a check (\checkmark) in the box of any property that is true and then provide a justification.

| True? | Property | Justification |
|-------------------------------------|------------------------------|---------------------------------|
| <input checked="" type="checkbox"/> | Opposite sides are parallel | Same slope +1 |
| <input checked="" type="checkbox"/> | Opposite sides are congruent | Same distance +1 |
| <input checked="" type="checkbox"/> | All sides are congruent | all sides have same distance +1 |
| <input type="checkbox"/> | Four right angles | |
| <input checked="" type="checkbox"/> | Diagonals bisect each other | Same midpoint +1 |
| <input type="checkbox"/> | Diagonals are congruent | |
| <input checked="" type="checkbox"/> | Diagonals are perpendicular | opposite reciprocal slope +1 |

+1

c. Based on the properties proven above, what is the most precise classification of this quadrilateral?

Rhombus +1

+12