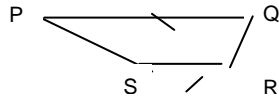**Unit: Quadrilaterals and Polygons**
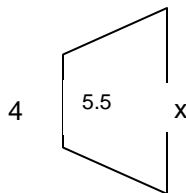**Flashcard: Properties of Parallelograms**

Directions: Answer the following questions.

1 If angle P measures 24 degrees, what is the measure of angle S?

2. Quadrilateral ABCD is an isosceles trapezoid with base angles A and B. Angle A measures $(3x + 5)°$ and angle B measures $(2x + 25)°$. Find the value of x.

3. Shown below is a trapezoid with its midsegment drawn. Find the value of x.

4. Isosceles trapezoid WXYZ has diagonal WY with measure $(7a + 12)$ feet and diagonal XZ with measure $(3a + 50)$ feet. Find the value of a and the length of the diagonals.

5. What type of quadrilateral is made with vertices at A(0, 0), B(0, 2), C(3, 5) and D(5, 5).

6 What is the length of the midsegment of the trapezoid made with vertices at A(0, 0), B(0, 2), C(3, 5) and D(5, 5).

7. If the parallel sides of a trapezoid are contained by the lines y = 2x + 5 and y = 2x + 1, what is the equation of the line that contains the midsegment?

Answers:

1.
$$m\angle P + m\angle S = 180$$
$$24 + m\angle S = 180$$
$$m\angle S = 156°$$

2. Base angles in an isosceles trapezoid are congruent.
3x + 5 = 2x + 25
3x = 2x + 20
x = 20

3. The length of the midsegment is one-half the sum of the bases.
$$5.5 = \frac{1}{2}\left(4 + x\right)$$
$$5.5 = 2 + \frac{1}{2}x$$
$$3.5 = \frac{1}{2}x$$
$$7 = x$$

4. Diagonals in an isosceles trapezoid are congruent.
7a + 12 = 3a + 50
7a = 3a + 38
4a = 38
a = 9.5

WY = XZ = 3(9.5) + 50 = 78.5 feet.

5. Graph the points.

The slope of BC =

$$\frac{5-2}{3-0} = \frac{3}{3} = 1$$

.

The slope of AD = $\frac{5-0}{5-0} = \frac{5}{5} = 1$

These sides are parallel.

Length of AB = $\sqrt{(0-0)^2 + (2-0)^2} = 2$

Length of CD = $\sqrt{(5-3)^2 + (5-5)^2} = 2$

These sides are congruent.

One pair of parallel sides and legs that are congruent makes an isosceles trapezoid.

6. Length of BC = $\sqrt{(3-0)^2 + (5-2)^2} = \sqrt{18} = 4.24$

Length of AD = $\sqrt{(5-0)^2 + (5-0)^2} = \sqrt{50} = 7.07$

Length of midsegment = $\frac{1}{2}(4.24 + 7.07) = 5.655$

7. The midsegment will be parallel to both these sides. The slope will also be 2.

m = 2

The y-intercept must be halfway between the two lines. Halfway between 5 (the y-intercept of the first line) and 1 (the y-intercept of the second line) is $\frac{1}{2}(5+1) = \frac{1}{2}(6) = 3$.

The equation is y = 2x + 3.

Graph to confirm.