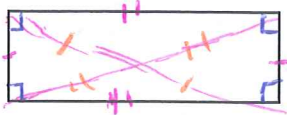


**GOALS:**

- Recognize and apply properties of the sides and angles of rectangles.
- Recognize and apply properties of the diagonals of rectangles.
- Use tests to distinguish between rectangles and other quads/parallelograms.

**Rectangle:** is a quadrilateral with 4 right  $\angle$ 's  
 Special type of parallelogram



Properties of Rectangles	Example	Figure
<p>1. Since a rectangle is a type of <i>parallelogram</i>, it has <b>all the properties of parallelograms!</b> List these: _____</p> <p>① opposite sides <math>\cong</math> and <math>\parallel</math></p> <p>② opposite <math>\angle</math>'s are <math>\cong</math></p> <p>③ consecutive <math>\angle</math>'s are <u>supplementary</u></p> <p>In addition to these properties, a rectangle has the following 2 "special" properties also:</p>	<p><math>\overline{AB} \cong \overline{CD}</math>   <math>\overline{AD} \parallel \overline{BC}</math>  <math>\overline{AB} \parallel \overline{CD}</math>   <math>\overline{AD} \cong \overline{BC}</math></p> <p><math>\angle A \cong \angle C</math>  <math>\angle D \cong \angle B</math></p> <p><math>\angle A + \angle D = 180</math>  <math>\angle A + \angle B = 180</math>  <math>\angle B + \angle C = 180</math>  <math>\angle C + \angle D = 180</math></p>	
<p>2. All four angles are <u>right</u> angles.</p>	<p><math>\angle A = 90</math>   <math>\angle D = 90</math>  <math>\angle B = 90</math>  <math>\angle C = 90</math></p>	
<p>3. Its diagonals are <u>bisect and <math>\cong</math></u>.</p>		

**Example 1:**

a) MATH is a rectangle. If  $MT = 7x - 4$ , and  $HP = 3x + 2$ , find  $x$ .

$$2 \cdot (3x + 2) = 7x - 4$$

$$6x + 4 = 7x - 4$$

$$8 = x$$

b) If  $MH = 32$ , find the area of rectangle MATH. (Round to the nearest whole number.)

$$7x - 4$$

$$7(8) - 4$$

$$56 - 4$$

$$52$$

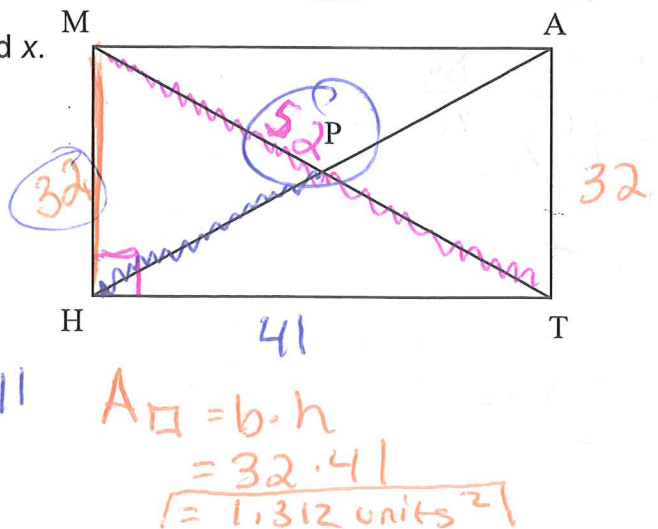
$$a^2 + b^2 = c^2$$

$$32^2 + b^2 = 52^2$$

$$1,024 + b^2 = 2,704$$

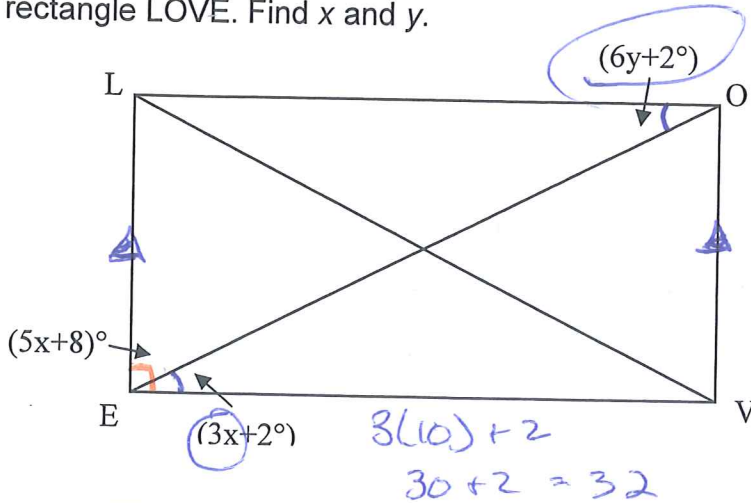
$$\sqrt{b^2} = \sqrt{1680}$$

$$b = 41$$



**Example 2:**

Given rectangle LOVE. Find x and y.



$$5x+8+3x+2=90$$

$$8x+10=90$$

$$8x=80$$

$$x=10$$

$$6y+2=32$$

$$6y=30$$

$$y=5$$

Tests for Rectangles; if <u>either</u> of the following are true, the figure is a rectangle:	Example	Figure
1. All 4 angles of the quadrilateral are <u>right <math>\angle</math>s</u> angles.	$\overline{WX} \perp \overline{ZY}$ $\overline{XY} \perp \overline{ZY}$	
2. The <u>diagonals</u> of a $\square$ are <u>congruent (<math>\cong</math>)</u> .	$\overline{QI} \cong \overline{ZU}$	

**Example 3:**

Given the following vertices, is  $\square$  ABCD a rectangle? (To use test #1, use the

slope formula; to use test #2, use the distance formula.)

A(-2,1), B(4,3), C(5,0), and D(-1,-2)

