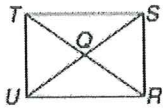
Rectangle Notes

Properties of Rectangles A rectangle is a quadrilateral with four right angles. Here are the properties of rectangles.



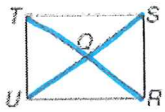
A rectangle has all the properties of a parallelogram.

- Opposite sides are parallel.
- Opposite angles are congruent.
- Opposite sides are congruent.
- Consecutive angles are supplementary.
- The diagonals bisect each other.

Also:

- All four angles are right angles. — $\angle UTS$, $\angle TSR$, $\angle SRU$, and $\angle RUT$ are right angles.
- The diagonals are congruent. — $\overline{TR} \cong \overline{US}$

Example 1 In rectangle $RSTU$ above, $US = 6x + 3$ and $RT = 7x - 2$. Find x.

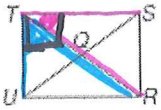


$RT \cong US$ diagonals of a rectangle are $\cong$

$7x - 2 = 6x + 3$

$x = 5$

Example 2 In rectangle $RSTU$ above, $m\angle STR = 8x + 3$ and $m\angle UTR = 16x - 9$. Find $m\angle STR$.



$\angle STU = 90°$ def of rectangle

$\angle STU = \angle STR + \angle UTR$ angle addition

$90 = 8x + 3 + 16x - 9$

$4 = x$

$m\angle STR = 8x + 3$

$m\angle STR = 8(4) + 3$

$m\angle STR = 35°$

3. If $AE = 3x + 3$ and $EC = 5x - 15$, find AC.

$AE \cong EC$ diagonals of a rectangle bisect each other

$3x + 3 = 5x - 15$

$9 = x$

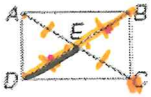
$AC = AE + EC$ Seg. addition

$AC = 3x + 3 + 5x - 15$

$AC = 3(9) + 3 + 5(9) - 15$

$AC = 60$

4. If $DE = 6x - 7$ and $AE = 4x + 9$, find DB.



$DE \cong AE$ diagonals of a rectangle are $\cong$ and bisect each other

$6x - 7 = 4x + 9$

$x = 8$

$DB = 2DE$

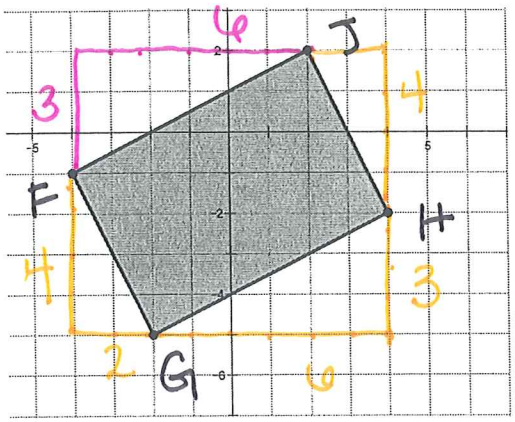
$DB = 2(6 \cdot 8 - 7)$

$DB = 82$

Polygons – Day _____

5. Determine whether the figure with vertices F(-4,-1),G(-2,-5), H(4,-2) and J(2,2) is a rectangle.

To be a rectangle, you must test for 4 Right angles



Perpendicular Slopes

Slope JH $= -\frac{4}{2} = -2$

Slope of FGH $= \frac{3}{6} = \frac{1}{2} > \perp$

Slope of FG $= -\frac{4}{2} = -2$ $> \perp$

Slope of JF $= \frac{3}{6} = \frac{1}{2} > \perp$

all consecutive sides are Perpendicular so it has 4 right $\angle$s $\therefore$ FJHG is a rectangle by definition