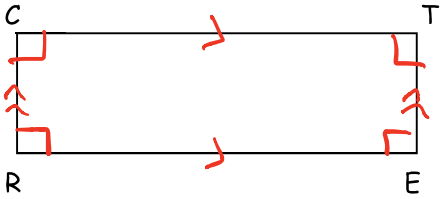
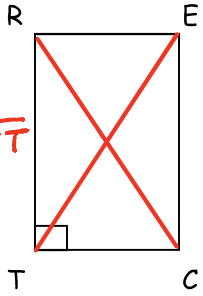
Quadrilaterals – Rectangles

Notes Section 6.4 Name_____

Rectangle: a quadrilateral with four right angles. (Also could define as a parallelogram with one right angle.)



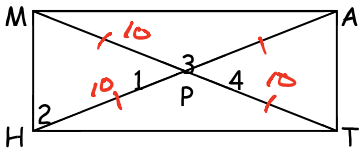
Theorem 6-11.12: A parallelogram is a rectangle IFF its diagonals are congruent.



RECT $\Leftrightarrow \overline{RC} \cong \overline{ET}$

Use rectangle MATH and given information to solve each problem.

#1) HP = 10. Find MT.

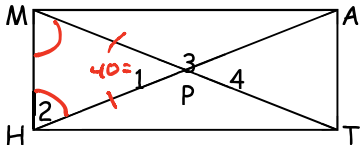


$MT = MP + PT$

$MT = 10 + 10$

$MT = 20$

#2) $m\angle 1 = 40°$. Find $m\angle 2$



$m\angle 2 + m\angle 2 + 40 = 180$

$2m\angle 2 + 40 = 180$

$2m\angle 2 = 140$

$m\angle 2 = 70$

Draw a counterexample to show that each statement below is false.

#3) If a quadrilateral has one pair of congruent sides, it is a rectangle.

T

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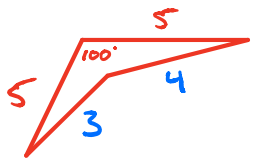

#4) If a quadrilateral has two pairs of congruent sides, it is a rectangle.

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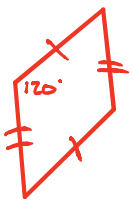
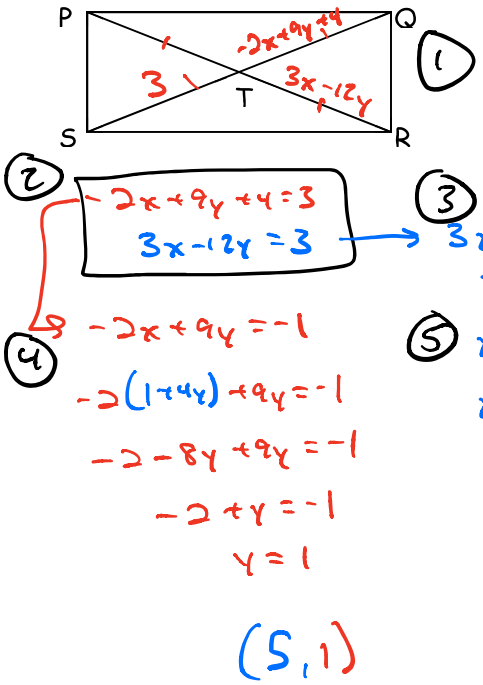


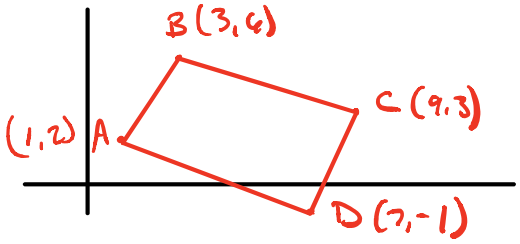
Quadrilaterals – Rectangles

Notes Section 6.4 Name_____

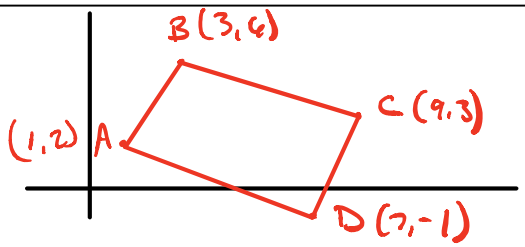
Find the values of x and y in rectangle PQRS.
#5) TR = 3x – 12y, TQ = -2x + 9y + 4, ST = 3



Determine whether ABCD is a rectangle. Explain.
#6) A(1, 2), B(3, 6), C(9, 3), D(7, -1)



Option 1: Use the distance formula to find the length of all four sides. Use the slope formula to find the slopes of two consecutive sides. *If opposite lengths are the same, and consecutive slopes are perpendicular, then the quad is a rectangle.
Option 2: Use the slope formula to find the slope of all four sides. *If opposite slopes are parallel and consecutive slopes are perpendicular, then the quad is a rectangle.
Option 3: Find the midpoints of the diagonals. Find the lengths of the diagonals. *If the midpoints of the diagonals are the same and the diagonals are the same length, then the quad is a rectangle.



$m_{\overline{BC}} = \frac{\Delta y}{\Delta x} = \frac{(6)-(3)}{(3)-(9)} = \frac{3}{-6} = -\frac{1}{2}$

$m_{\overline{AD}} = \frac{\Delta y}{\Delta x} = \frac{(2)-(-1)}{(1)-(7)} = \frac{3}{-6} = -\frac{1}{2}$

$m_{\overline{AB}} = \frac{\Delta y}{\Delta x} = \frac{(2)-(6)}{(1)-(3)} = \frac{-4}{-2} = 2$

$m_{\overline{CD}} = \frac{\Delta y}{\Delta x} = \frac{(3)-(-1)}{(9)-(7)} = \frac{4}{2} = 2$

ABCD is a Rectangle because both pairs of opposite sides are parallel and consecutive sides are ⊥.