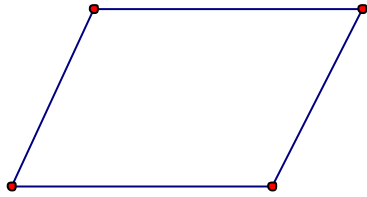
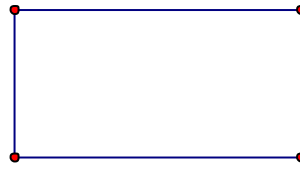


6-4: Special Parallelograms (Rectangle, Rhombus, Square)

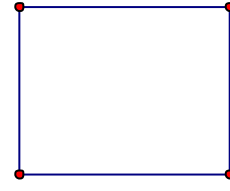
- A **rectangle** is a parallelogram with 4 right angles.
 - The diagonals are congruent
- A **rhombus** is a parallelogram with 4 congruent sides.
 - The diagonals are perpendicular
 - The diagonals bisect opposite angles
- A **square** is a parallelogram with 4 right angles and 4 congruent sides.
 - It is both a rectangle and a rhombus, so it has all the properties of both (see above)



Rhombus



Rectangle

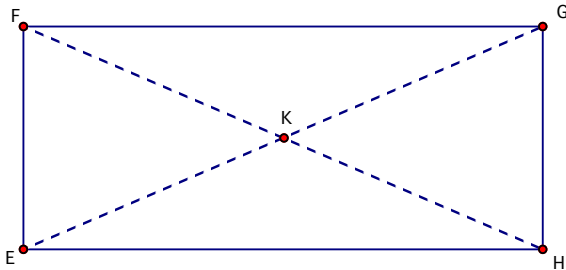


Square

EX 1) Are the following statements *always*, *sometimes*, or *never* true?

- a) A rectangle is a square. _____
- b) A square is a rhombus. _____

EX 2) $EFGH$ is a rectangle. K is the midpoint of \overline{FH} . If $FG = x + 4$, $FH = \sqrt{3x^2}$ and $GH = \sqrt{2x^2}$. What are the possible values for EK and GK ?



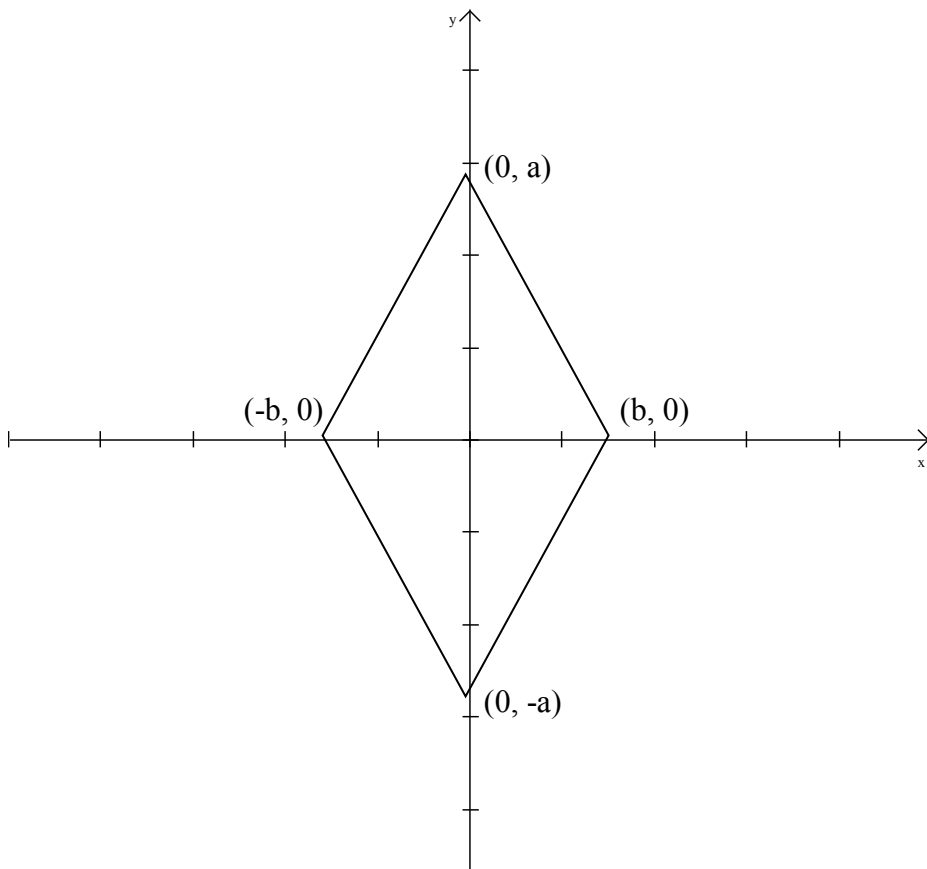
EX 3) $RSTV$ is a rhombus. Diagonals \overline{SV} and \overline{RT} intersect at W . Draw a picture to represent the situation. If $\angle TSW = (y + 2)^\circ$ and $\angle SWT = (2y + 10)^\circ$, find the measure of $\angle WSR$.

6-5: Conditions for Special Parallelograms

- If one angle of a parallelogram is a right angle, then the parallelogram is a rectangle.
- If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.
- If one pair of consecutive sides of a parallelogram are congruent, then the parallelogram is a rhombus.
- If the diagonals of a parallelogram are perpendicular, then the parallelogram is a rhombus.
- If one diagonal of a parallelogram bisects a pair of opposite angles, then the parallelogram is a rhombus.

**Using these conditions, you can prove whether a parallelogram is a rectangle, rhombus, or square. Often, we will do so using coordinate proofs.*

EX 4) Prove that the quadrilateral below is a **rhombus**.



EX 5) Use the diagonals to determine whether a *parallelogram* with vertices $K(-5, -1)$, $L(-2, 4)$, $M(3, 1)$, $N(0, -4)$ is a rectangle, rhombus or square. Give all names that apply.

