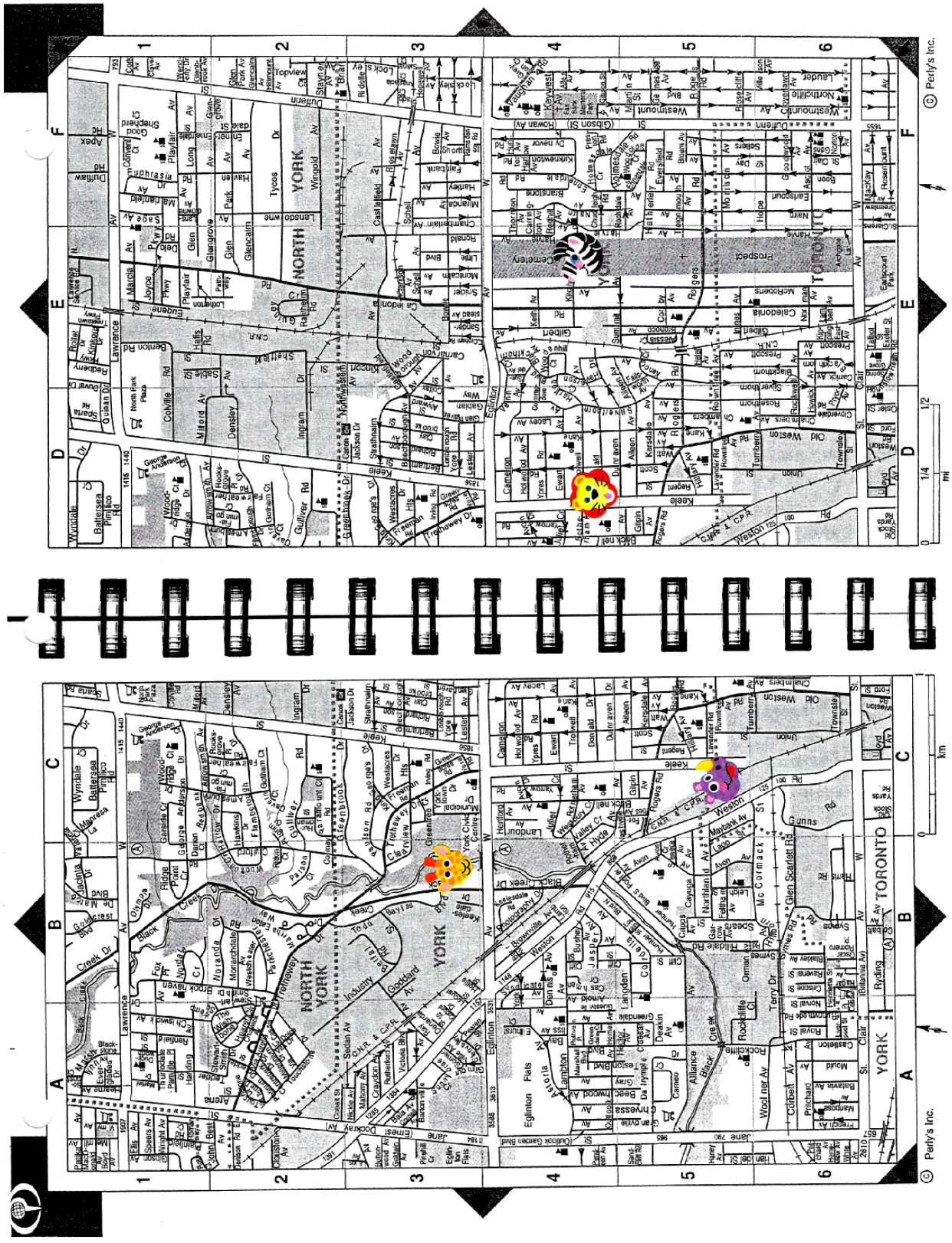
AChor/MFM2P **Name:** _____

Date: _____

Worksheet 4-1: Cartesian Plane and Ordered Pairs

Map vs. Cartesian Plane: Find the location of each animal.



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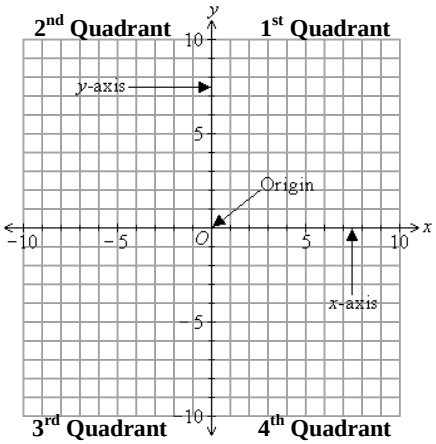
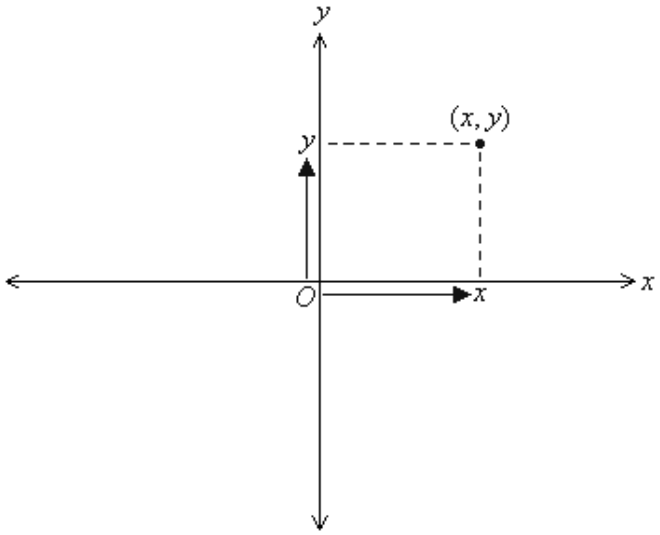
Cartesian Plane

- **René Descartes**, a 17th century mathematician, developed a system for graphing ordered pairs (points) on a grid. This system is called the **Cartesian coordinate system**.
- The Cartesian plane is known as the ***xy*-plane**.
- The Cartesian coordinate system consists of a **horizontal *x*-axis** and a **vertical *y*-axis**.
- The intersection point of these axes is called the origin. The coordinates of the origin are (0, 0).
- The *x*- and *y*- axes divide the plane into 4 regions called **quadrants**. **The axes themselves do not belong to any of the quadrants.**

The **Cartesian plane** consists of two directed lines that **perpendicularly** intersect their respective zero points.





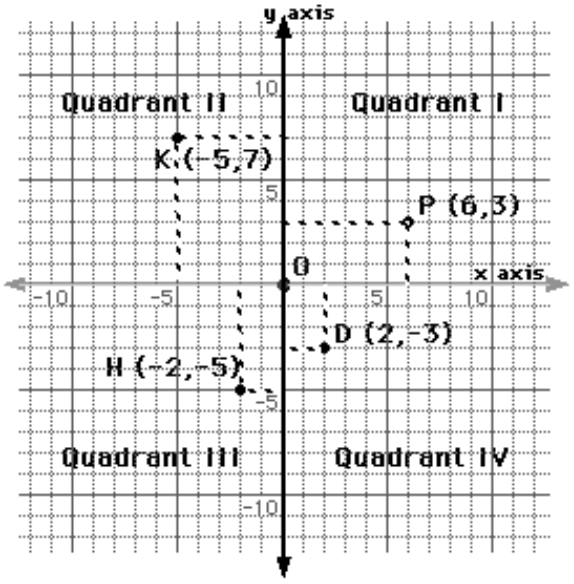
The **position of any point** on the Cartesian plane is described by using two numbers: **(*x*, *y*)**.

The first number, *x*, is the **horizontal** position of the point from the origin. It is called the ***x*-coordinate**.

The second number, *y*, is the **vertical** position of the point from the origin. It is called the ***y*-coordinate**.

Since a specific order is used to represent the coordinates, they are called **ordered pairs**.

In each ordered pair, the *x*-value indicates the number of units to move left or right, and *y*-value indicates the number of units to move up or down.



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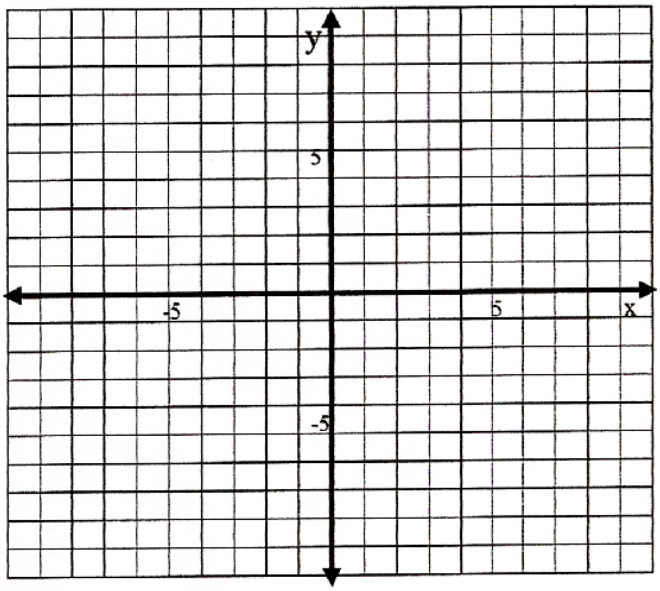
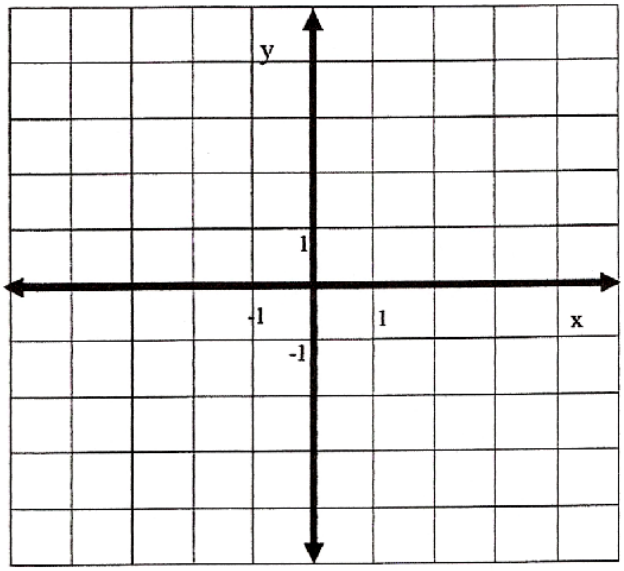
1. Plot each set of points on the grid below.
Join the points to form a quadrilateral.
Identify the quadrilateral

Set 1: A(1, 1), B(1, 5), C(– 3, 5), D(– 3, 1)
Set 2: J(1, – 3), K(5, 1), L(8, 1), M(4, – 3)
Set 3: P(– 3, 0), Q(– 6, – 2), R(4, – 4), S(10, 0)



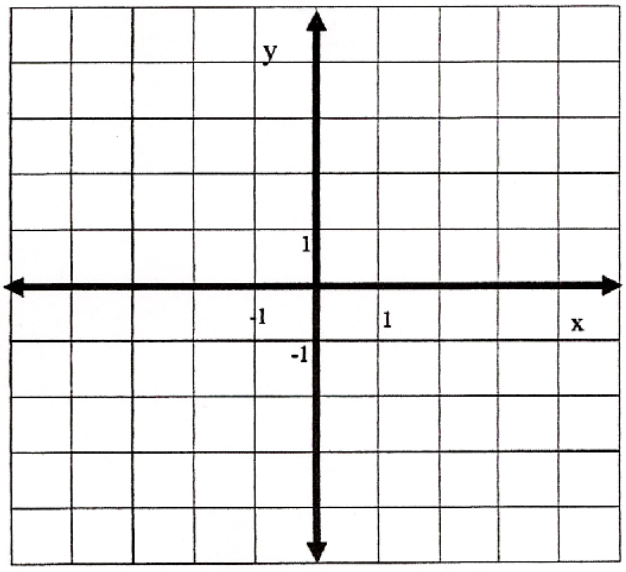
2. Plot these points.
Connect the points in order.
Name the polygon.

(1, – 1), (2, 1), (1, 3), (– 1, 4), (– 3, 3),
(– 4, 1), (–3, –1), (–1, – 2), (1, – 1)

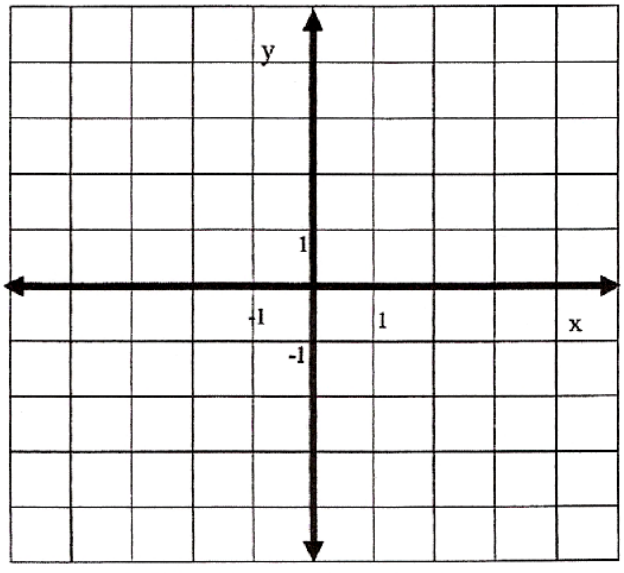


3. Plot these points.
Connect the points in order.
What picture do you see?

(2, 1), (5, 5), (1, 2), (0, 5), (– 1, 2), (– 5, 5),
(– 2, 1), (– 5, 0), (– 2, – 1), (– 5, – 5),
(– 1, – 2), (0, – 5), (1, – 2), (5, – 5),
(2, – 1), (5, 0), (2,1)

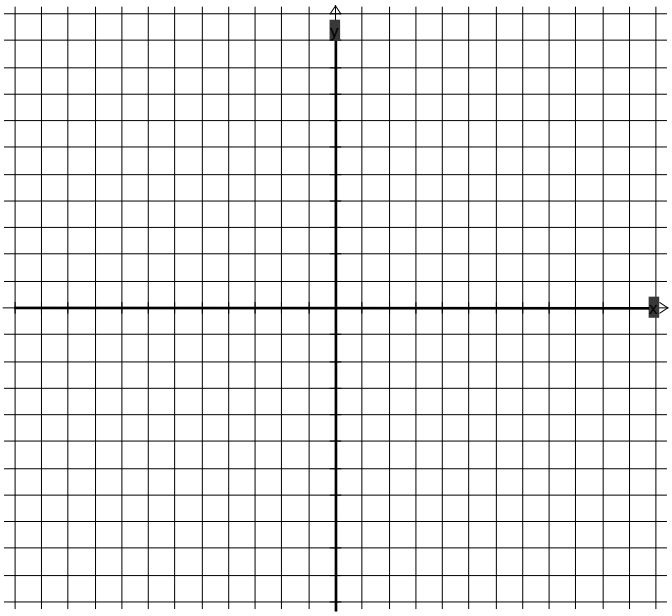


4. Make your own picture. Record the points in order. Exchange your picture code with a classmate and construct each other's picture.

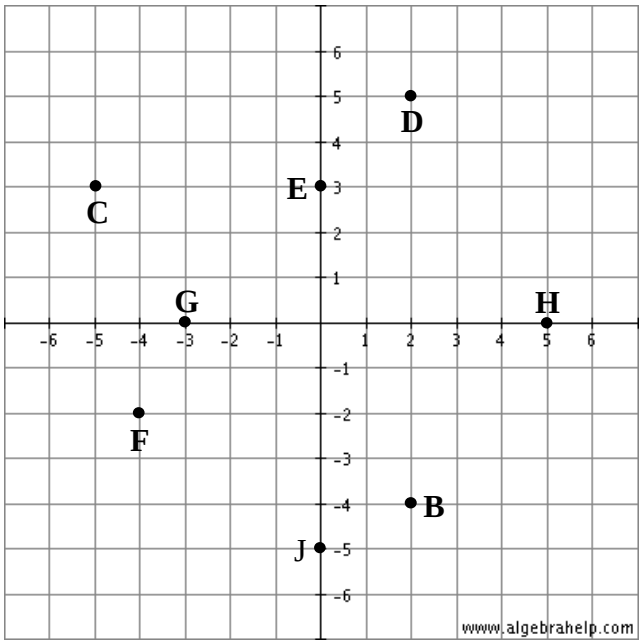


5. Plot each point on a Cartesian plane and state which quadrant it is in.

A (3, –1) B (–2, –4) C (–3, 2) D (5, 2) E (2, 0) F (0, –3) G (0, 4) H (–3, 0)

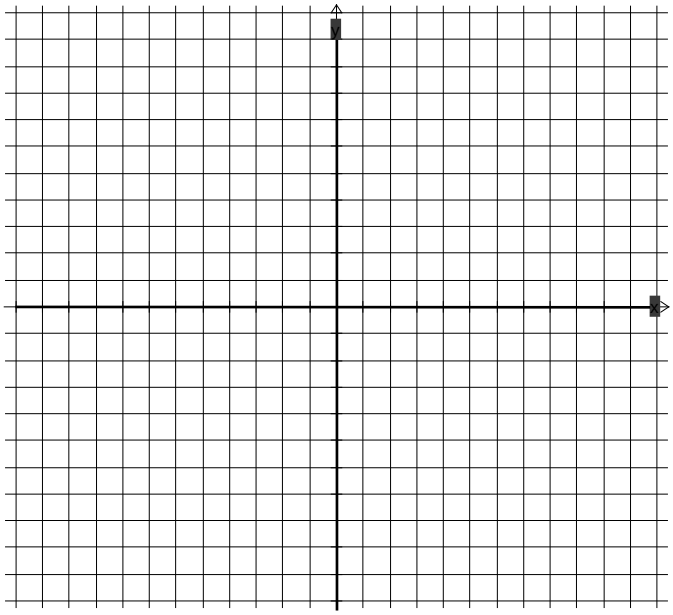


6. Name the coordinates for each point shown below.

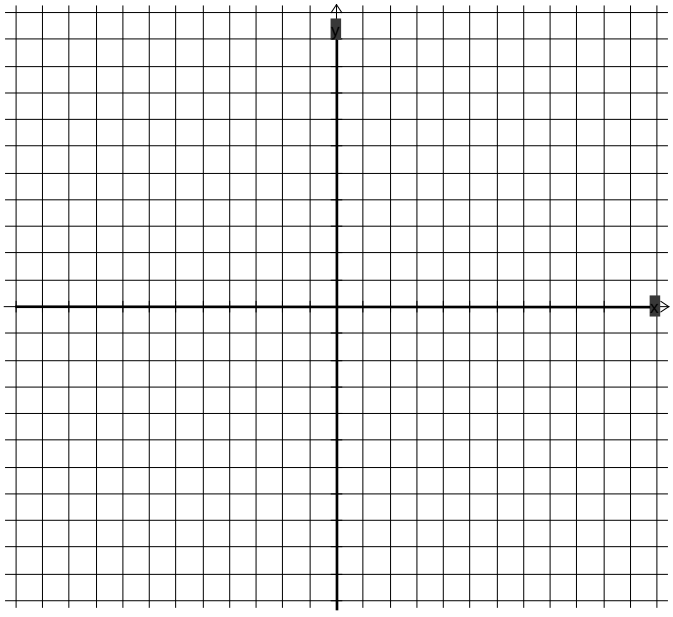


Answers: **1.** Set 1: square, Set 2: parallelogram, Set 3: trapezoid**; 2.** octagon**; 3.** star
5. A: 4th, B: 3rd, C: 2nd, D: 1st, E: none, F: none, G: none, H: none
6. B (2, –4), C (–5, 3), D (2, 5), E (0, 3), F (–4, –2), G (–3, 0), H (5, 0), J (0, –5)

7. Write the coordinates (or ordered pairs) of any five points whose first coordinates are –3. Then plot the points. How are these points related?



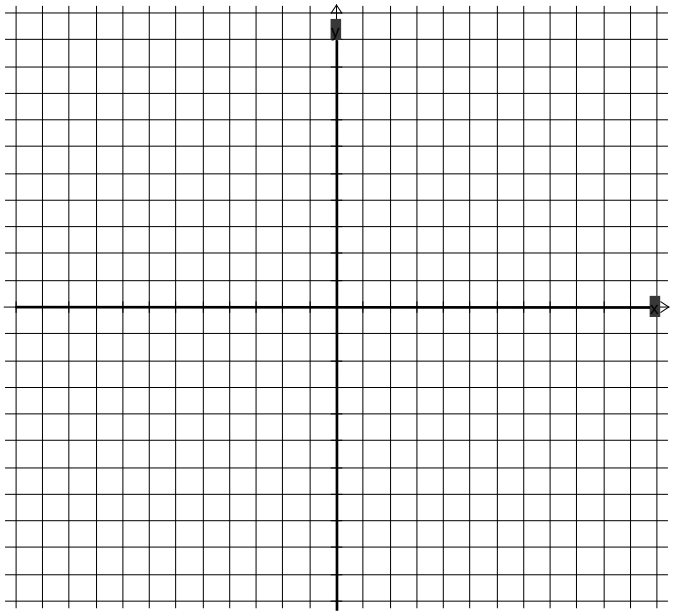
8. Write the coordinates (or ordered pairs) of any five points whose second coordinates are –5. Then plot the points. How are these points related?



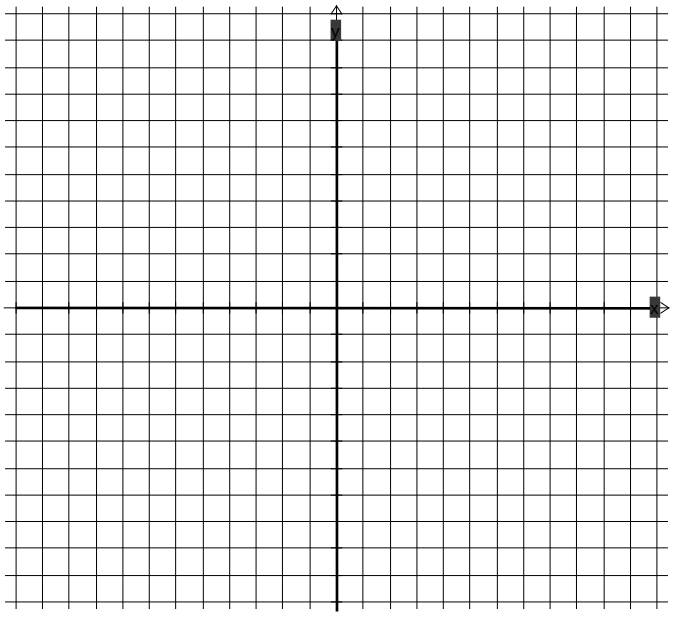
Answers: 7. They lie on a vertical line**; 8.** They lie on a horizontal line.

9. (a) Plot each set of points and join them in order to form a quadrilateral. (Label each point.)
(b) Identify each quadrilateral.

(i) A (1, 1), B (1, 5), C (–3, 5), D (–3, 1)



(ii) J (1, –3), K (5, 1), L (8, 1), M (4, –3)



Answers: 9. (i) Square, (ii) Parallelogram