MTH1W – Unit 6: Coordinate Geometry

Name: _____

Lesson #6.1: The Coordinate Plane

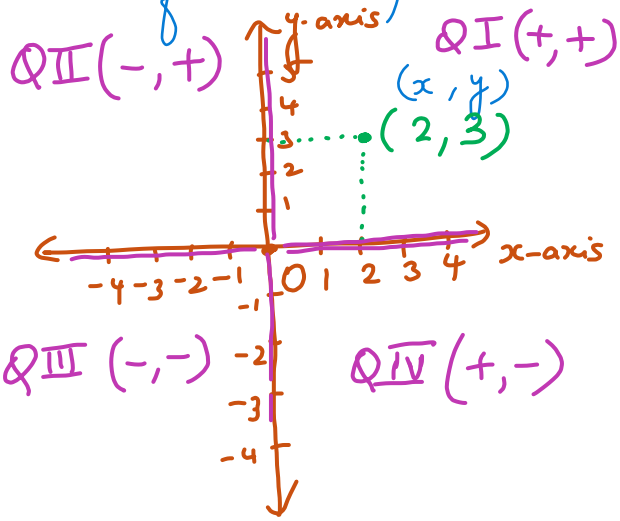
Date: _____

Learning Goal: We are learning how to use the coordinate grid system.

In this chapter and the next, we will learn a lot of new vocabulary. You need to become intimate with these words, so let's first define them, then draw/label them!

Coordinate Plane (CARTESIAN PLANE): It is a grid formed by two number lines placed perpendicular to each other, thus, helping us to define the position of every point on the plane by a set of ordered pair.

Quadrants → 4 sections in the coordinate plane created by the two perpendicular number lines.



x-axis → Horizontal Number line in the Cartesian plane

y-axis → Vertical Number line in the cartesian plane.

x-coordinate → H. distance of the point from the vertical line (y-axis)

y-coordinate → V. distance of the point from the x-axis.

Ordered Pair → P (x, y)

Origin → The point at which x-axis and y-axis meet.
Coordinates of Origin always (0, 0)

Example 1: **Graph the following points on the given grid.**

x y

A (3 , 4)

B (-1, 4)

C (4, -2)

D (-5, -4)

E (2, 5)

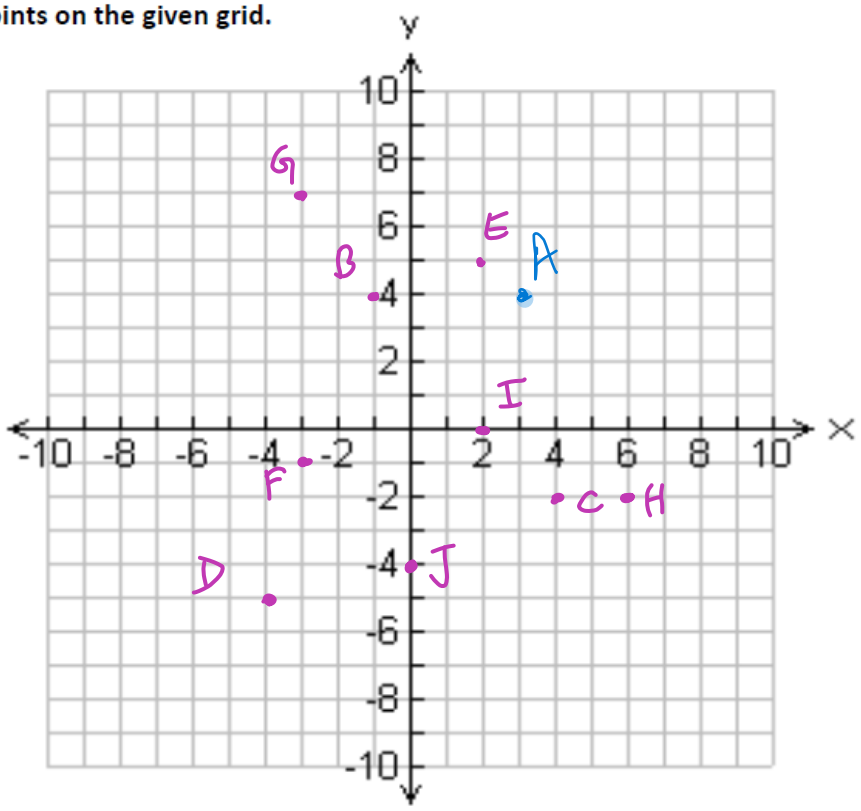
F (-3, -1)

G (-3, 7)

H (6, -2)

I (2 , 0)

J (0 , -4)



Example 2: **Calculate the area of a triangle with vertices at A(-5,-3), B(3,-3), and C(3,8)**

$ar(\Delta) = \frac{bh}{2}$

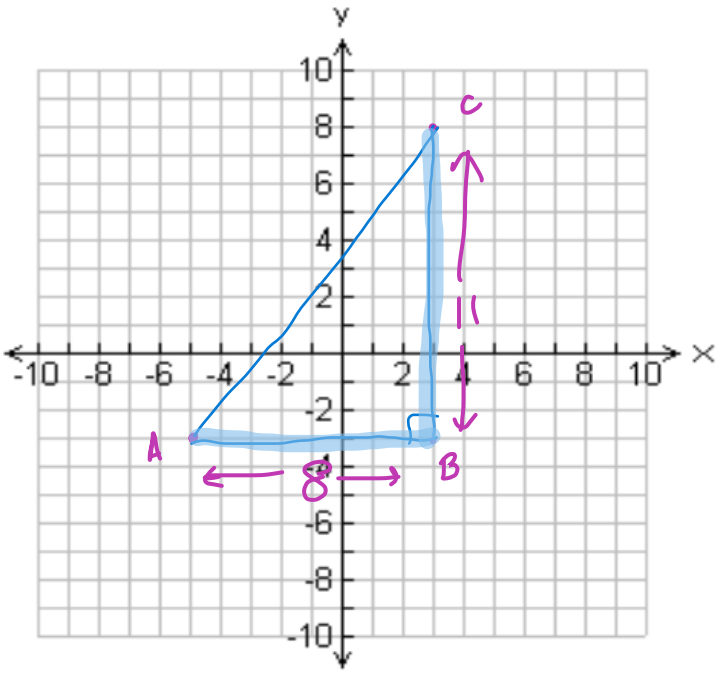
Step 1: Plot the points and connect the points to form a triangle

Step 2: Find the length of the base and height

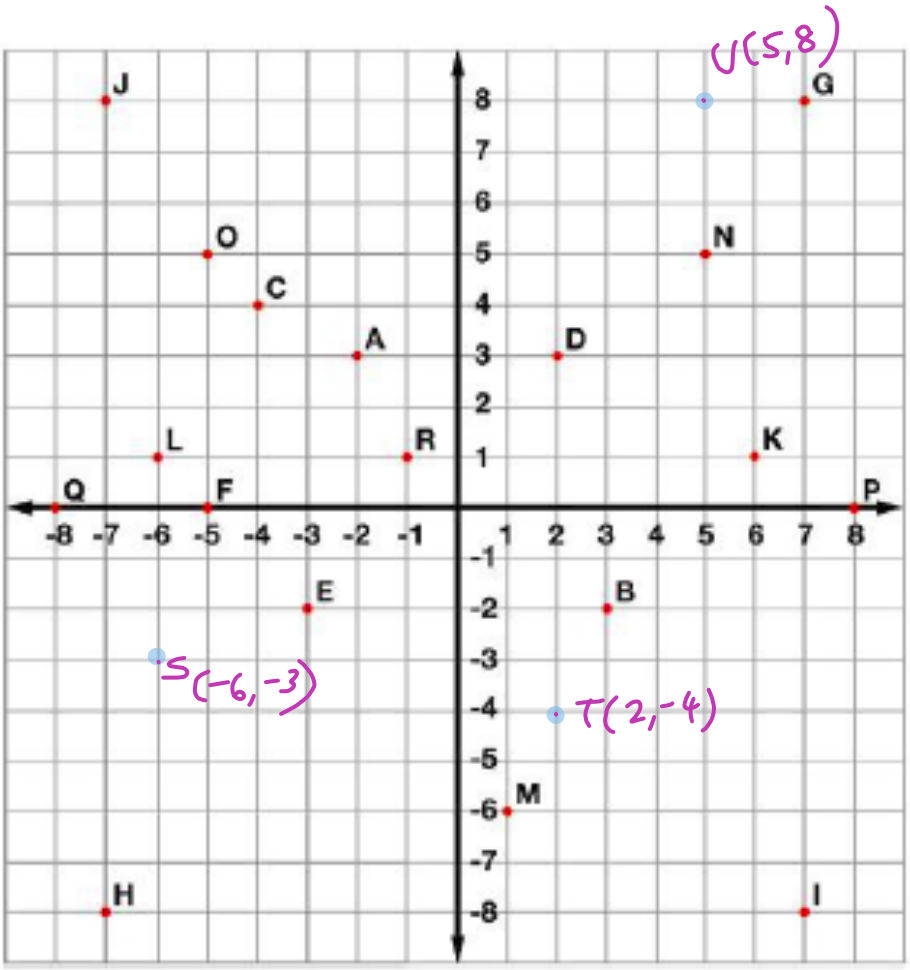
$b = 8$; $h = 11$

$\therefore ar(\Delta) = \frac{(8)(11)}{2}$

$= 44$ sq. units



Step 3: Calculate the area



Tell what point is located at each ordered pair.

1. **(3,-2)** B
2. **(2,3)** D
3. **(-5,5)** O
4. **(-7,-8)** H
5. **(-4,4)** C
6. **(-5,0)** F

Write the ordered pair for each given point.

7. **E** (-3,-2)
8. **M** (1,-6)
9. **P** (8,0)
10. **G** (7,8)
11. **Q** (-8,0)
12. **N** (5,5)

Plot the following points on the coordinate grid.

13. **S (-6,-3)**
14. **T (2,-4)**
15. **U (5,8)**

Success Criteria:

- I can define the important key terms that are used in the coordinate grid system
- I can tell the difference between the “x” and “y” coordinates in an ordered pair
- I can find an ordered pair on a coordinate grid

Build your Skills: :)

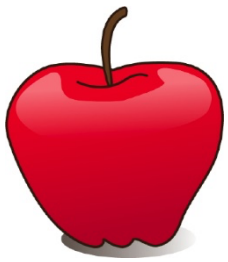
1. If the point (3, a) lies on the graph of the linear relation described by the equation $y = 9 - 4x$, determine the value of a.

$\Rightarrow a = 9 - 4(3)$
$\Rightarrow a = 9 - 12$
$\Rightarrow a = -3$

2. If the ordered pair (k, 15.3) satisfies the equation $y = 4.5x - 16.2$, determine the value of k.

$\Rightarrow 15.3 = 4.5k - 16.2$
$\Rightarrow 15.3 + 16.2 = 4.5k$
$\Rightarrow 31.5 = 4.5k \Longrightarrow 7 = k$

3. The equation $h = -5t^2 + 6t + 1.5$ represents the approximate height of an apple that has been tossed into the air. The height, h, is measured in metres and the amount of time since the apple has been thrown, t, is measured in seconds.



$h = -5t^2 + 6t + 1.5$

(t, h)

a) Does the point (0,1.5) satisfy the given equation? Explain.

Left side: $h = 1.5$

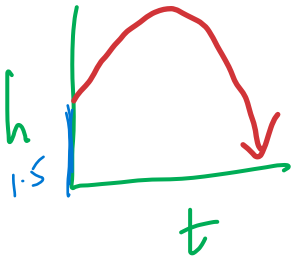
Right side: $-5(0)^2 + 6(0) + 1.5$
$= 0 + 0 + 1.5 = 1.5$

Yes! It satisfied the equation because left = Right.

b) Explain the meaning of the ordered pair (0,1.5) in the context of the given situation.

(t, h)

In the context of the given situation, $h = 1.5$m at $t = 0$ sec.
i.e. The height of the apple before it was thrown was 1.5m.



c) Determine the height of the apple one second after it has been tossed.

$h = ?$ $\quad t = 1$

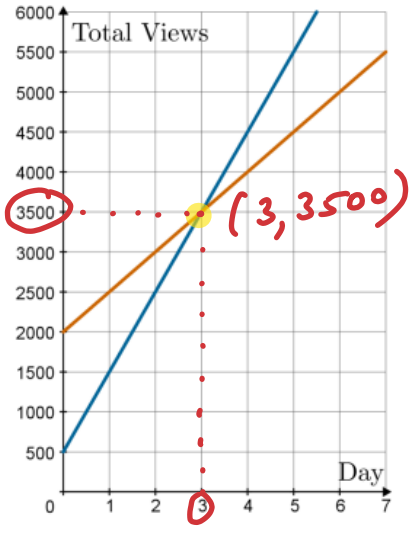
$h = -5(1)^2 + 6(1) + 1.5$
$h = -5 + 6 + 1.5 = 2.5$

∴ After 1 sec, the height of the apple is 2.5m

d) Express the result from part (c) as an ordered pair.

$(t, h) = (1, 2.5)$

4. The diagram on the right shows the total number of views for two different videos over a period of one week.



a) State the coordinates of the point at which the two lines intersect.

(3, 3500)

b) Explain the meaning of the point of intersection.

In three days, the total views on both videos is 3500.