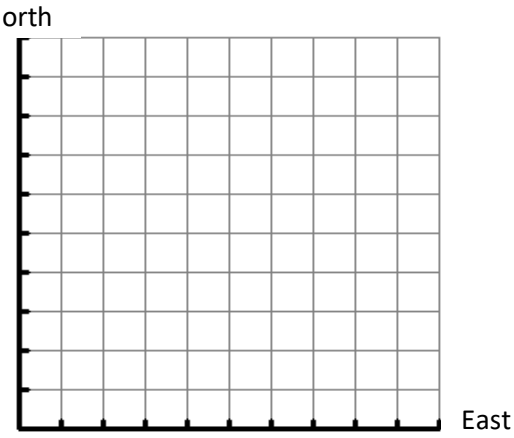
Walking and Flying Around Hogsmeade – An Introduction to Vectors - 2020

Harry Potter's broom is broken, so he needs to take it to Dervish and Banges for repairs.
Because his broom is broken, Harry must walk between the buildings and he makes some stops on the way.
The town is laid out in square blocks, which makes it easy to give directions.

1. The table shows the directions Harry follows on Monday to get to Dervish and Banges.
Use the graph to draw Harry's trip. Put Hogwarts at the origin. Label each stop.

Monday – start at Hogwarts		
	N / S	**E / W**
Stop 1	5 blocks North	3 blocks East
Stop 2	2 blocks North	5 blocks East
Stop 3	1 block North	2 blocks East
total # of blocks	_____ blocks North	_____ blocks East
return to Hogwarts	_____ blocks South	_____ blocks West



2. Fill in the blank parts of the table to give Harry directions to get back to Hogwarts. (Make your directions simple, so Harry must make only one turn.)

Harry's trusted owl, Hedwig, can fly over buildings,
so she travels in a straight line from Hogwarts to Dervish and Banges and waits for Harry to arrive.

3. On your graph paper from #1, use a different color to draw an arrow representing Hedwig's direct path from Hogwarts to Dervish and Banges.

*In mathematics, we use a directed line segment, or **vector**, to indicate a **magnitude** (length or distance) and a **direction**. Each part of Hedwig's trip has a distance and a direction, so the arrows you just drew for Hedwig's path are vectors.*

4. To get from Hogwarts to Dervish and Banges, how far did Hedwig fly?
(Hint: Use Pythagorean Theorem.)

5. There are several ways to describe Hedwig's direction during this leg of the trip. We could simply say Hedwig traveled "northeast," but this would not be a very accurate description. Why not?

6. Using inverse trig, we can find Hedwig's direction (θ in degrees) going from Hogwarts to Dervish and Banges on Monday.

$$\tan\theta = \frac{8}{10}$$

$$\theta = \tan^{-1}\left(\frac{8}{10}\right)$$

$$\theta = \_\_\_\_\_$$

** You have just found magnitude and direction of a vector! **