

Name _____ Date _____ Class _____

Using Vectors to Calculate Total Displacement

Tools

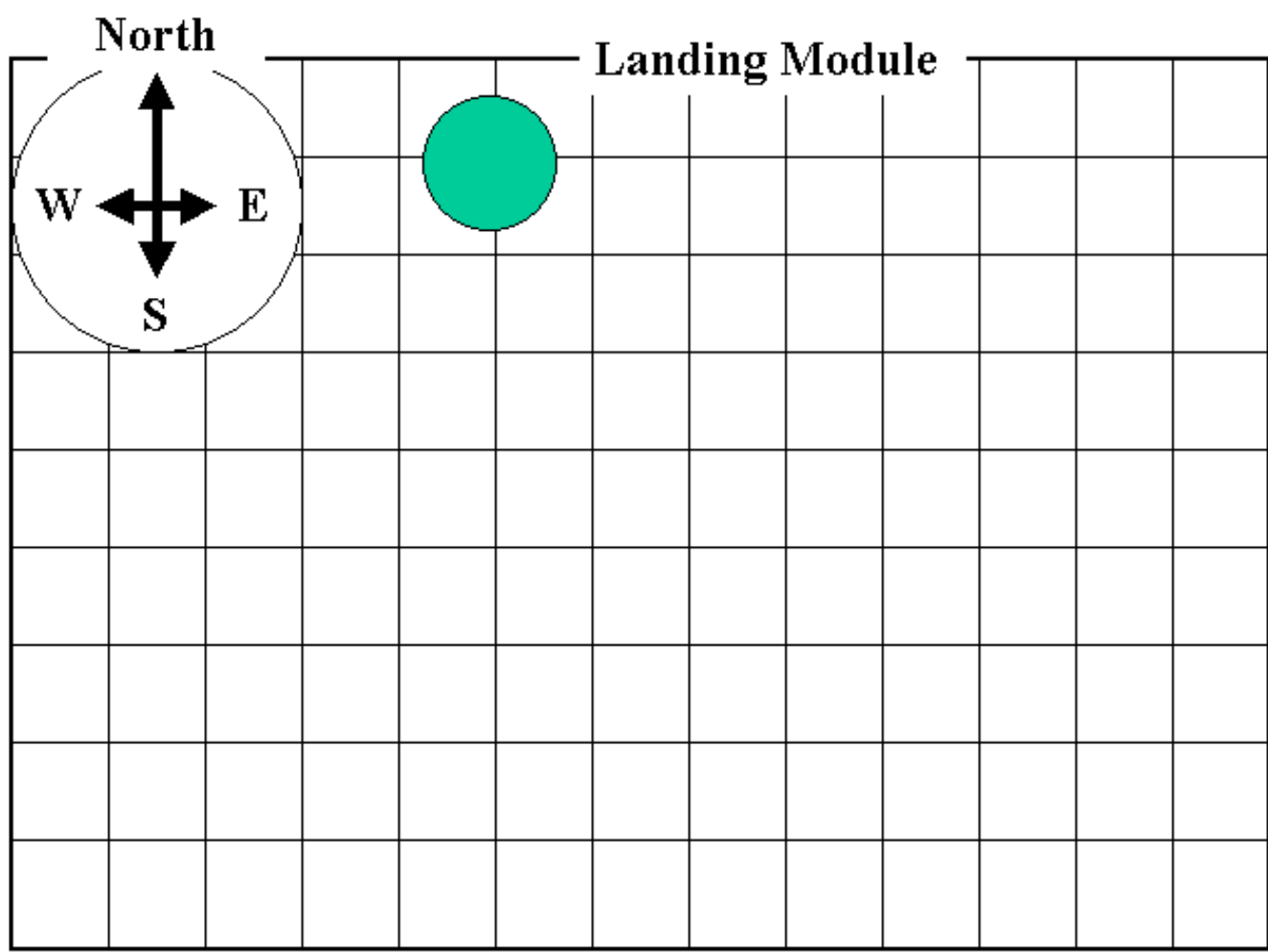
Pencil, Ruler, Protractor

Directions

Vectors are scaled lines that describe direction and magnitude. We will use a scale of 1/4" equal to a distance (magnitude) of 1 foot. Example: A vector representing a distance of 5 feet will be drawn 5 x 1/4" in length, or 1-1/4" long. Direction will be specified by compass direction

The Problem

Sandra is a scientist at JPL labs in Pasadena California. She has been given a data set about the past 5 movements of a mobile surface robot on Mars. She must determine the position of the robot in relation ship to the landing module.



Location Data Recorded by the Surface Module Since Leaving the Landing Module

| Time | Direction | Distance |
|----------------|------------------|-----------------|
| 0 hrs. 12 min. | East | 6 ft. |
| 0 hrs. 20 min. | South | 12 ft. |
| 0 hrs. 40 min. | North West | 8 ft. |
| 0 hrs. 50 min. | South | 6 ft. |
| 0 hrs. 60 min. | North East | 5 ft. |

Questions:

- 1.) How far is the Surface Robot away from the Landing Module?
[Hint: Use the measurement of the resultant vector. The resultant vector is the line drawn from the landing module (start point) to the last position of the surface module (end point).]**
- 2.) What is the approximate compass bearing as seen from the landing module to the surface module.**
- 3.) Did the surface module exhibit constant velocity throughout it's 1 hour journey?**
- 4.) During which of the 5 movements did the surface module record the fastest velocity? The slowest?**
- 5.) What was the average velocity in feet per second of the surface module. Determine this using the resultant distance and total time.**