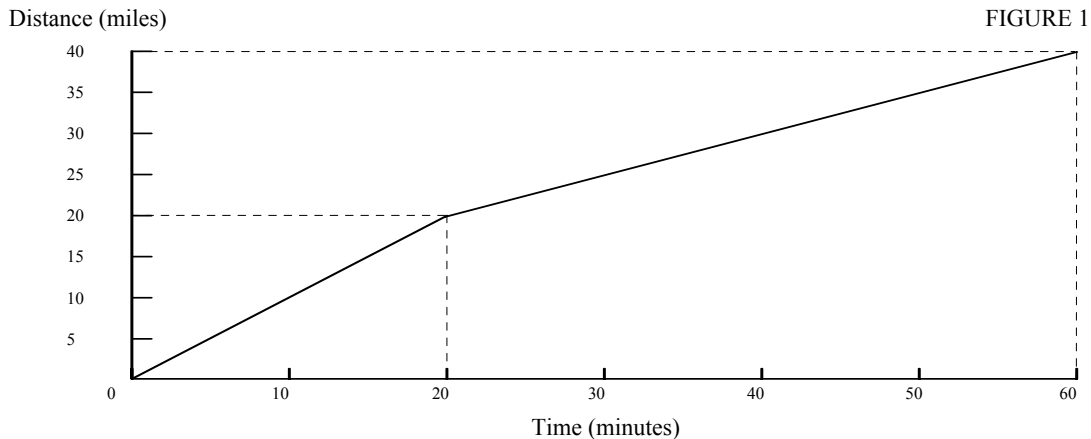


**KIN 335 - Biomechanics  
PROBLEM SET 1**

**Instructions:** Read each question carefully. On a separate sheet of paper, complete each problem and label your final answer clearly. Make sure that you show all of your work for full credit.

1. A new trail leads a hiker down a path which winds 5 km due east, 7 km north, 3 km east, and 4 km south. What was the total distance traveled? What was total displacement? Relative to the start of the trail, what was the direction of the total displacement vector?
2. If the hiker in the previous problem completed the entire trail in 7 hours, what was the average speed of the hiker? What was the magnitude of the average velocity?
3. A cyclist travels 40 miles in one hour. Use Figure 1 below to answer the following questions.
  - a. What was the average speed during the first 20 minutes of the ride in mph?
  - b. What was the average speed during the last 40 minutes of the ride in mph?
  - c. What was the average speed during the entire ride in mph?



4. At the instant of take-off, a long jumper has a forward velocity of 32 ft/sec and a vertical velocity of 12 ft/sec. Find the angle of take-off (relative to the horizontal), and the magnitude of the resultant velocity vector.
5. A figure skater completes a double axle (2 complete rotations) in 0.5 seconds. Calculate the skater's average angular velocity in a) deg/sec, and b) rad/sec.
6. In the skater in the previous problem manages to stop spinning in a time of 1.5 seconds, what was the average angular acceleration during this period (in deg/s)?