

average = 6.5
 $\sigma = 2.8$

Quiz #1: Representing Motion

Problem 1 (2 points)

Which one of the following is the longest length?

C

- a) 10^0 meters
- b) 10^2 centimeters
- c) 10^4 millimeters**
- d) 10^5 micrometers
- e) 10^7 nanometers

a) 1m
 b) $10^2(10^{-2}m) = 1m$
 c) $10^4(10^{-3}m) = \underline{\underline{10m}}$

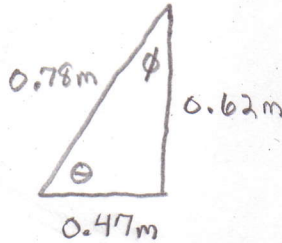
d) $10^5(10^{-6}m) = 10^{-1}m$
 e) $10^7(10^{-9}m) = 10^{-2}m$

Problem 2 (2 points)

Three sticks are arranged to form a right triangle. If the lengths of the three sticks are 0.47 m, 0.62 m and 0.78 m, what are the three angles of the triangle?

E

- a) $90^\circ, 45^\circ,$ and 45°
- b) $90^\circ, 62^\circ,$ and 28°
- c) $90^\circ, 59^\circ,$ and 31°
- d) $90^\circ, 48^\circ,$ and 42°
- e) $90^\circ, 53^\circ,$ and 37°**



$\theta = \tan^{-1}\left(\frac{0.62m}{0.47m}\right) = \underline{\underline{53^\circ}}$
 $\phi = \tan^{-1}\left(\frac{0.47m}{0.62m}\right) = \underline{\underline{37^\circ}}$

Problem 3 (2 points)

Interpret the following problem by drawing a motion diagram showing the object's position and its velocity vectors. Do not solve this problem or do any mathematics.

In a typical greyhound race, a dog accelerates to a speed of 20 m/s over a distance of 30 m. It then maintains this speed. What would be the greyhound's time in the 100 m dash?



Problem 4 (4 points)

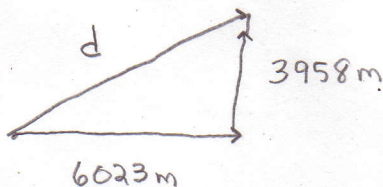
A saber-toothed tiger on the prowl walks east for 2.50 miles, and the spots prey and runs north at 5.0 km/hr for 47.5 minutes, and finally walks east for 2.00 kilometers. What is the magnitude of the tiger's net displacement, in meters?

$2.50 \text{ mi} \left(\frac{1609 \text{ m}}{1 \text{ mi}}\right) = \underline{\underline{4023 \text{ m east}}}$

$5.0 \text{ km/hr} \left(\frac{1000 \text{ m}}{1 \text{ km}}\right) (47.5 \text{ min}) \left(\frac{1 \text{ hr}}{60 \text{ min}}\right) = \underline{\underline{3958 \text{ m north}}}$

$2.00 \text{ km} \left(\frac{10^3 \text{ m}}{1 \text{ km}}\right) = \underline{\underline{2.00 \times 10^3 \text{ m east}}}$

displacement east is
 $\Delta x = 4023 \text{ m} + 2.00 \times 10^3 \text{ m}$
 $= \underline{\underline{6023 \text{ m}}}$
 $\Delta y = \underline{\underline{3958 \text{ m}}}$



$d = \sqrt{(6023 \text{ m})^2 + (3958 \text{ m})^2}$

$d = 7207 \text{ m} = 7.2 \times 10^3 \text{ m}$