

# PHY 166 Recitation 1

Chapters 1,2 and 3.

February 10, 2019

1.) Answer the following:

(a.) Represent the number 314024 in scientific notation.

(b.) Multiply the following three numbers together and express your answer with the appropriate number of significant figures:  $1.45 \times 10^5$ ,  $6.2391 \times 10^{-2}$  and  $4.10 \times 10^3$ .

(c.) Add the following distances together and express your answer with the appropriate number of significant figures: 5.2 m, 310.75 cm, and  $4.0 \times 10^5$  km.

2.) A car travels along a straight road and covers a distance in three segments:

*Segment 1:* The car starts at rest and accelerates at  $3 \text{ m/s}^2$  until it reaches its top velocity of  $15 \text{ m/s}$ .

*Segment 2:* It then cruises at that constant velocity for 15 seconds.

*Segment 3:* Right after that, it brakes and comes to a stop 7 seconds later.

(a.) How long did it take for the car to reach its top velocity in segment 1.

(b.) What was the acceleration in segment 3?

(c.) What was the total distance traveled for the entire trip

(d.) Sketch a plot of velocity versus time for the entire trip.

3.) A person standing on the edge of a cliff throws a rock straight upwards with an initial speed of  $44 \text{ m/s}$ .

(a.) What will be the maximum height the rock reaches?

(b.) If the cliff stands at a height of 105 meters from the bottom of the ravine, how long will it take to reach the ground?

(c.) How fast will it be traveling when it reaches the ground?

(d.) Sketch a plot of velocity versus time and displacement versus time for the motion of the rock.

4.) A police officer leaves the station to begin her patrol. She drives a distance of 6 miles in a direction 41 degrees south of east. She then follows a route traveling 12 miles in a direction 77 degrees north of east.

(a.) What is the officer's displacement from the police station? What is the total distance she traveled? Sketch a figure of her patrol.

(b.) If the first leg of her patrol took 0.1 hours and the second took 0.05 hours, what is the average speed and velocity of her trip?

5.) An archer shoots an arrow at an angle 30 degrees from the height 1.4 meters. If it takes 1.6 seconds for the arrow to hit a 1.4-meter tall target, what is the arrow's initial speed? How far away is the target? What is the maximum height, from the ground, the arrow reaches?