

Physics

Final Exam Review Sheet – 1st Trimester

I. Introductory Topics

- significant digits
- *order of magnitude* estimation
- algebra review
- problem solving methodology
- *dimensional analysis*
- systems of units/unit conversions
- graphing
- right triangle trigonometry
- *ACTIVITY: Measurement Using the Tools of the Lab
- *LAB: Direct and Indirect Measurement

II. Vectors

- *head to tail method* of addition
- resolving a vector into components
- *component method* of addition
- *Activity: Vector Walk
- *LAB: The Vector Nature of Forces

III. Kinematics in 1D and 2D

- *displacement, velocity, acceleration*
- graphs of distance vs. time and velocity vs. time
- equations of kinematics in one and two dimensions
 - draw a picture
 - choose a positive direction
 - make a chart to organize givens
 - choose an equation and solve
 - check your answer for sensibility
- projectile motion problems
- *relative speed* and *relative velocity*
- *Activity: Measuring Speed and Acceleration (tape timers)
- *Activity: Graphs of Speed and Acceleration With a PASCO Interface
- *LAB: Target Practice with a Projectile Launcher

IV. Newton's Laws

- the **Law of inertia**
- the **Law of acceleration**

- the **Law of force-counter force**
- the **Law of Universal Gravitation**
- weight, *tension*, and normal forces
- *static* and *kinetic* frictional forces
- equilibrium applications - $\sum F = 0$
 - draw a picture
 - choose a positive direction
 - write $\sum F = 0$ in each direction
 - get as many equations as needed and solve
 - check your answer for sensibility
- non-equilibrium applications - $\sum F = ma$
 - draw a picture
 - choose a positive direction
 - write $\sum F = ma$ in each direction
 - get as many equations as needed and solve
 - check your answer for sensibility
- *LAB: Newton's Laws With Dynamics Carts

Problem-Solving Review

1.) Use the component method to find the resultant of the five forces below. Draw a diagram showing the vectors being added in two different orders with the same result. Add the "opposites" of the five vectors below. Do you get the opposite of your original resultant?

A = 125 lbs @ 60° W of S

B = 222 lbs @ 35° S of E

C = 177 lbs @ 26° N of E

D = 245 N due West

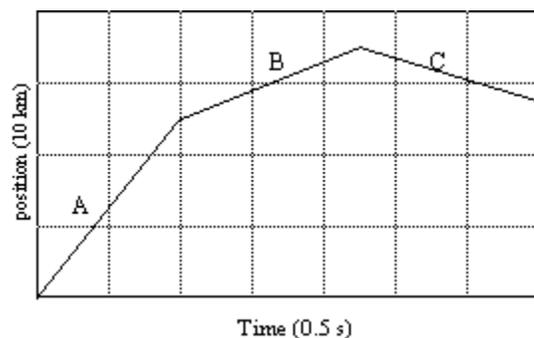
E = 32 lbs @ 10° W of N

2.) A ski jumper reaches the bottom of a ski ramp with a speed of 78.0 mph. If the jumper has a mass of 64.0 kg, find the *range* and *maximum height* of the jump if the angle of the launch is 40.0° . And the end of the ramp is 3.30m above the ground. How would these values change if she lands 5.00 m below the ramp?

3.) At what value above the Earth's surface would the value of g be one half that at the surface?

4.) Travelling at 16.1m/s the driver of an automobile suddenly slams on the brakes and locks the wheels. If the coefficient of kinetic friction between the tires and the road is 0.88 how far does the car skid before coming to a halt? How would the distance differ if the car was equipped with antilock brakes and the static friction coefficient was 0.95?

5.) A bus makes a trip according to the position-time graph below. What is the average velocity of the bus on each interval? Where does the bus have maximum speed? Where is the bus accelerating? What is the average acceleration from interval A to B? Draw a velocity vs. time graph to correspond with this graph.



6. In the picture at right, $M_1 = 660$ g and $m_2 = 600$ g. (a) Ignoring friction, find the acceleration of the system. (b) Determine the mass needed for m_2 in order for the system to be in *equilibrium*.

