

1. Complete the following table:

Quantity	Unit	Abbreviation
Mass		kg
	Meters per second	m/s
	Meters	m
Force	Newtons	
Energy		
	Meters per second ²	m/s ²

2. Convert 1250 cm to meters.

3. Convert 20 kg to grams.

4. Where possible, units of measure are abbreviated. As an example, a Newton is an abbreviation for mass \times acceleration ($m \times a$). A joule is the abbreviation for...

5. As indicated, write the following either in scientific notation or "long-hand"

a. 125,000 m = _____

b. 1.06×10^5 kg = _____

c. .000165 J = _____

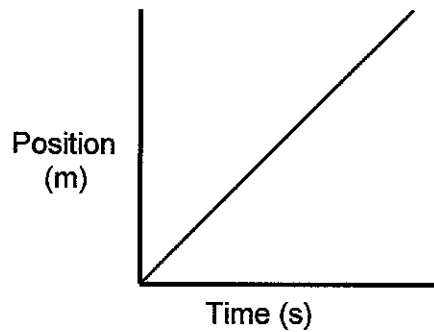
d. 4.5×10^{-5} s = _____

6. What is the difference between a vector and a scalar?

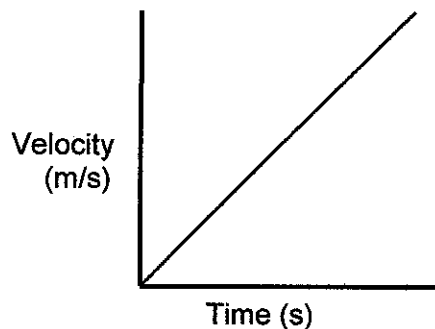
7. Indicate whether the following quantities are vectors or scalars by checking the appropriate box.

Quantity	Vector	Scalar
Temperature		
Mass		
Velocity		
Distance		
Speed		
Displacement		
Weight		

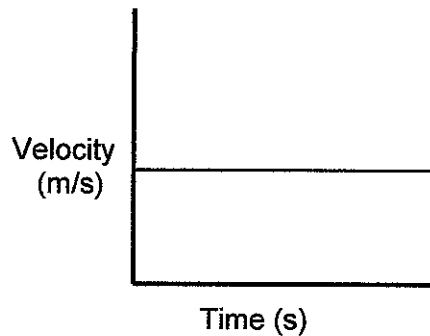
8. The slope of the following graph represents what quantity?



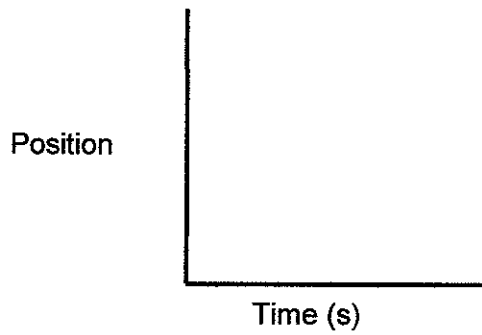
9. The slope of the following graph represents what quantity?



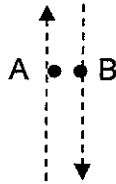
10. What is the acceleration of the object with the following velocity-time graph?



11. Sketch the position–time graph of an object undergoing constant acceleration.



12. A thrown rock has the following trajectory. What is the magnitude of the rock's acceleration at points (A) and (B) and its direction at both points?



At point (A): Magnitude _____ Direction _____

At point (B): Magnitude _____ Direction _____

13. A 10 kg object, subjected to a 100 N horizontal force is moving to the right at a **constant velocity** across a floor.

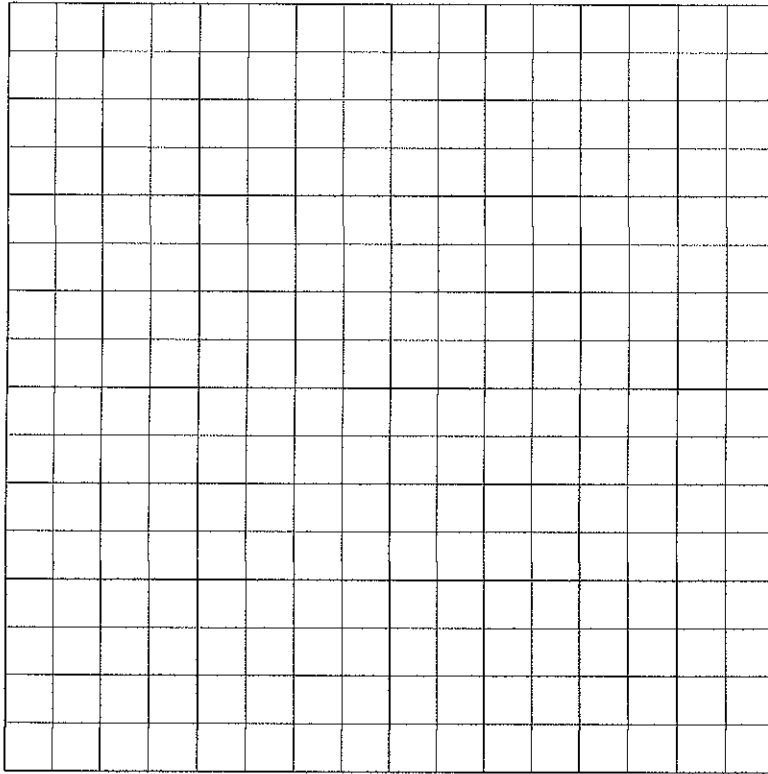
a. Draw the free body diagram of the object.

b. What is the magnitude of the gravitational force on the object?

c. What is the magnitude of the normal force on the object?

d. What is the magnitude of the frictional force on the object?

14. Solve the following graphically. A student walks 10 m east, 7 meters north, 4 meters west, and 4 meters south. Determine the magnitude and direction of the resulting displacement vector and the distance traveled.



Displacement = _____

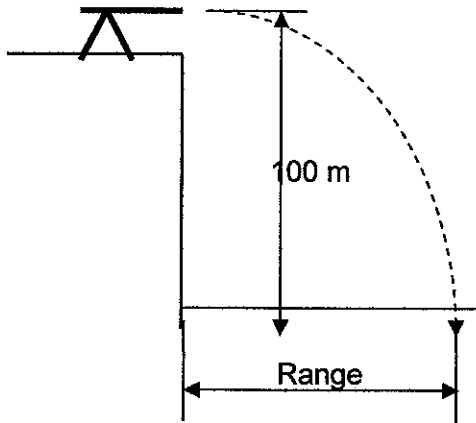
Direction = _____ degrees _____ of _____

Distance = _____

15. A train travels 2000 m in 60 seconds at a constant velocity. Calculate the average velocity of the train.
16. A box, initially at rest, slides down a 10 m ramp in 2 seconds. Calculate the velocity of the box at the bottom of the ramp.
17. Using the same information in the problem above, calculate the acceleration of the box.

18. How long does it take a 10 kg ball to fall a vertical displacement of 100 m?
If the mass of the ball were increased to 20 kg, how long would it take the ball to fall the same displacement?

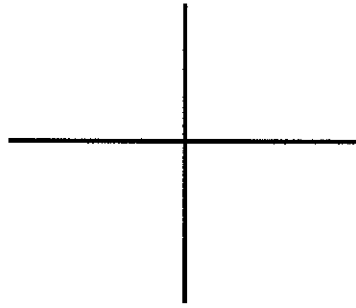
20. A cannon is positioned on a cliff 100 m above the ground and fired horizontally with various muzzle velocities. Complete the data table.



Muzzle Velocity	Range
10 m/s	
20 m/s	
40 m/s	
80 m/s	

21. A velocity vector with a magnitude of 20 m/s and direction of 45° N of E. What are the two components of this vector?
22. Student walks 100 m east and then 500 m north. What are the resulting displacement vector and its direction? What distance did the student travel?

23. A resultant vector is drawn at 130° from the vertical. Sketch the two vector components.



24. A 10 kg object has a weight of 120 N. Is this object on the earth?
25. A 100 N horizontal force causes a 10 kg cart to accelerate at a rate of 5 m/s^2 . What is the force of friction?
26. A 100 kg object is at rest on the top of a 100 m cliff. Calculate the object's potential energy at this position. As the object falls, describe its change in its potential energy, if any.
27. Using the information from the above problem, what is the object's kinetic energy, when it is 75 m above the base of the cliff? As the object falls, describe its change in its kinetic energy, if any.
28. What is the amount of work done in holding a 10 kg box still 10 m above the ground?

29. A crate moves across a frictionless horizontal surface at a constant velocity of 10 m/s. What is the object's velocity after 10 seconds?
30. A 10 kg bowling ball is dropped vertically from a 100 m building. What is the velocity of the bowling ball just before it hits the ground?
31. Referring to a previous lab on horizontal projectile motion, a steel ball bearing is given a constant horizontal velocity of 2.0 m/s across a lab countertop that is 1.0 m above the floor.
- Calculate the time it takes for the ball bearing to hit the floor.
 - What displacement from the base of the counter does the ball bearing strike the floor (range)?
32. A 50 kg crate is subjected to a force of 100 N at an angle of 45° above the horizontal.
- If the crate's displacement is 20 m, calculate the amount of work done on the crate.
 - If this displacement occurred over a time interval of 10s, what was the power supplied?

33. A person pushes a stalled car for 50 m and does 5000 J of work. A second person did the same amount of work while pushing a heavier car only 25 m. Calculate the amount of force exerted by each person.

PHYSICS FINALS REVIEW-CONCEPTS

Welcome to your finals reviewing guide. Use your notes, books, old labs, quizzes, tests, and brains to help prepare.

Beginning of the year stuff, what you need to know.

- conversions, how do you set up a conversion (HINT!!! Have your units next to the numbers, so the old unit will cancel out leaving only the unit you want)
- Know what the SI units for measuring things are (what is the unit for velocity? Distance? Mass?)
- can you read or write numbers in scientific notation?

Basic concepts

! MAKE SURE YOU KNOW the symbols and units for each concept (i.e. v =velocity, its unit is m/s)

- what is the difference between displacement and distance?
- what is the difference between speed and velocity?
- what is the difference between a scalar and a vector?

- When you are solving a problem with algebra, you CANNOT just switch a variable to another side. You must multiply, divide, subtract, or add it to both sides!

- When you solve a problem, carry the units all through the problem and when you need to do conversions it's always a good idea to do them all first so you don't forget.

- If your units don't come out with the proper unit for a physics concept like velocity, then double check your math.

- GRAPHS, can you read a graph properly! What is on what axis? What is the title, what does the slope tell you, how do you find slope?

- what does a negative sign tell you in physics for a vector?

Kinematics

- !-know position vs. time, what is the slope of this?
- !-what does a constant velocity look like on a position vs. time graph? What does a constant acceleration look like on a position vs. time graph?
- !-what does a constant velocity look like on a velocity vs. time graph? What does a constant acceleration look like on a velocity vs. time graph?

- when finding a velocity, remember the definition is CHANGE in displacement over CHANGE in time. It can also be said as the rate of the change in displacement.
- *Remember, acceleration is the CHANGE in velocity over the change in time. If you use d/t to find v , that is only 1 velocity. You CANNOT simply divide that by time to find acceleration, since that is not a CHANGE in velocity.

Set up your problems with Givens and Unknowns.

If you have a constant velocity, what is your acceleration?

What is 9.8m/s^2 ? It is ACCELERATION DUE TO GRAVITY on Earth. **NOT GRAVITY (remember based on the situation you may or may not have to add a negative)**

Can you identify what formulas to use to solve problems by looking at what your given?

FORCE

If you have no acceleration, what is your force?

If you have a constant velocity, what is your force?

What does the force of an object depend on?

What is weight? What is the difference between weight and mass?

Is normal force always equal and opposite the force of gravity?

Which way does the normal force point in reference to the surface?

If an object isn't touching a surface, does it have a normal force?

What is friction?

What is air resistance?

What is tension force?

What is applied force?

What is net force?

Can you make or interpret a free-body diagram?

Given only a mass can you figure out the force of gravity?

Given a mass, a v_i , v_f , and a time, could you find the net force on an object (look at your givens).

PROJECTILES

-Remember to separate into vertical and horizontal

-How does vertical motion affect horizontal? Does it?

WORK and ENERGY

If you have no NET force, what is your net work?

If you have no acceleration, what is your net force?

If you have a constant velocity, what is your net force?

What is the SI unit for Work?

How does work done relate to energy?

What is the difference between kinetic energy and potential energy?

What does work depend on? What does kinetic energy depend on? What does potential energy depend on?