

Name: \_\_\_\_\_  
AP Summer Assignment

Grade: \_\_\_\_\_/60  
Gazdovich

You must fully answer every conceptual question. For questions asking for a specific answer all work must be shown with substitution of units.

Define the following terms:

1. Scalar: \_\_\_\_\_
2. Vector: \_\_\_\_\_
3. Magnitude: \_\_\_\_\_
4. Inertia: \_\_\_\_\_
5. Impulse: \_\_\_\_\_
6. Conservation: \_\_\_\_\_
7. Acceleration due to gravity on Earth: \_\_\_\_\_

8. Circle all of the following terms that are vector quantities:

Speed	Velocity	Displacement	Kinetic Energy	Power
Acceleration	Distance	Potential Energy	Momentum	Impulse
Work	Mass	Time		

9. What are the standard units in physics for the following quantities:

Length:

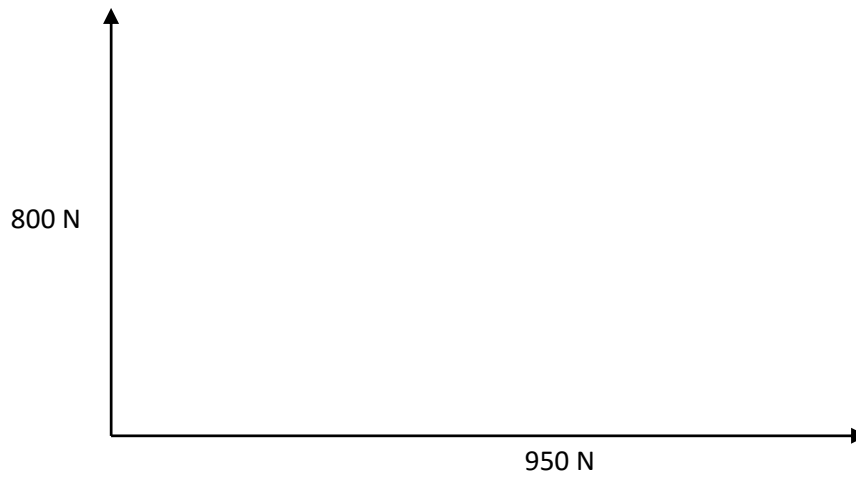
Time:

Mass:

10. How many nanometers<sup>2</sup> are in 54 centimeters<sup>2</sup>?

11. A car is traveling at 20 mph. What is this speed in standard units?

12. The following picture represents two concurrent forces acting on an object?

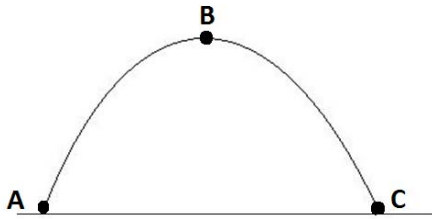


- Draw the resultant and equilibrant force.
- Calculate the magnitude of the resultant force.
- Calculate the angle between the vertical force and the resultant force.

13. A 500 kg car rolls off of a cliff 50 meter tall cliff with a speed of 20 m/s.

- How long does it take the car to hit the ground?
- How far away from the base of the cliff does the car land?

14. Describe the velocity, acceleration and time for each point on the diagram below.



15. What is the acceleration of a car that changes its speed from 20 m/s to 15 m/s in 3 seconds?

16. Draw a free body diagram for the objects listed below all surfaces have friction:

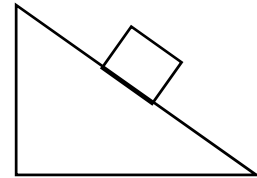
a. Block in free fall



b. Block on a table being pushed to the right at a constant speed



c. Block sliding down a ramp



17. A 5 kg block is pushed with a constant speed of 20 m/s with a force of 50 N. What is the force of friction between the block and the surface it is being pushed on?

18. What is the normal force and parallel force acting on a 5 kg block resting on a 30° incline?



20. A 1500 kg car is traveling 30 m/s east when it collides elastically with a 2000 kg truck traveling 20 m/s west.

a. What is the total momentum?

b. If the trucks speed after the collision is 2 m/s east, what was the finals speed of the car?

21. A brother (80 kg) and a sister (45 kg) are holding hands while on ice skates traveling at 5 m/s east.

a. What is their total momentum?

b. If the brother pushes off the sister with a force of 20 N, what force does the sister feel?

c. Once the brother pushes the sister he has a velocity of 1 m/s west. What is the sisters speed?