# Physics Unit 4 Review

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period \_\_ Date \_\_\_\_\_\_\_

**For questions 1-3, draw the force diagram for the block.**

1. A block is held in place by a weight strung over a pulley.

2. A block rests on the floor with a weight strung over a pulley.

3. A wrecking ball is held motionless by a cable.



1. a. Two force vectors act on an object. One acts due East at 20 N the other acts due South 15 N. What is the net force(resultant) acting on the object?

b. Again two force vectors act on an object. However, this time one acts due north at 35 N and the other acts 45° south of east at 23 N. What is the net force(resultant) acting on the object?

5. For the four forces acting on the car name the Newton’s third law pair that goes with each one.

a. Force normal of the road pushing on the car

c. Force of static friction of the road pushing on the car.

b. Force of resistance of the air pushing on the car.



d. Force of gravity of the earth pulling on the car.

a. b.

c. d.

6. Write the equations for the sum of the forces acting in the x and y directions for the junction of the cords in the diagram below.



1. Draw a force diagram(including components)
2. Create an equation that sums up the forces in the x-direction.
3. Create an equation that sums up the forces in the y-direction.
4. Find the values of wt and T2.

7. A 10 kg box slides down a 35° incline at constant speed.

a. Draw a force diagram(include components)

35°

10 kg

b. Create an equation that sums up the forces in the y-direction.

c. Determine the force normal acting on the box.

1. On a Saturday afternoon your parents ask you to mow their lawn and you

happily comply. Your arms supply a tension force of 60 N along the handle of the 35 kg mower at an angle of 30° with the horizontal as the mower moves at a constant speed. (a) Draw a force diagram for the lawn mower.

30°

(b) Determine the X and Y component forces of 60 N force along the handle.

(c.) Write an equation for the forces acting in the x-direction.

(d) What is the force of friction acting on the mower

(e) What is the weight of the lawn mower?

(f) Write an equation for the forces in the y-direction.

(g.) What is the normal force applied to the mower?

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Unit IV: Inertia & Interaction

What you should know when all is said and done

1. Describe and give examples of Newton's 1st Law.

Newton's 1st Law: An object at rest or moving at constant velocity continues its current motion unless acted upon by an outside agent (force).

2. Given a diagram or a written description of the forces acting on an object.:

a. draw a force diagram for the object

b. resolve the forces into **x** and **y** components, then find the vector sum of the forces.

c. state whether the velocity of the object is constant or changing.

3. Given a diagram or description of an object in equilibrium, including the forces acting on the object, determine the magnitude and direction of the "missing" force required to keep the object from accelerating.

4. State Newton's 3rd Law; apply it in situations in which you are trying to determine all the forces acting on an object.

All forces come in pairs; paired forces are equal in magnitude, but opposite in direction but they do not cancel. FAB = -FBA

## Questions to Ponder

1. What is a force?

2. What is Newton’s First Law? Give an example that illustrates it.

3. What is Inertia? How is it related to mass?

4. What is meant by a Net Force?

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

6. How are two vectors added when they are pointing in the same direction? Opposite directions?

7. What method can be used when adding two vectors that are at right

angles?

8. What is the resultant? Is it a vector?

9. When two vectors are added at acute and obtuse angles what

math technique is best to use when solving for the resultant?

10. How are vectors subtracted?

11. What is a component of a vector? How are components determined?

What angle exist between two components?

12. Can vector be shorter then one of its components?

13. What is the MKS unit for force?

14. What is Newton’s Third Law? Give an example that illustrates it.

15. What is difference between mass and weight?

16. What is the normal force?

17. What is friction? In what direction does it act?

18. What is a free body or force diagram?

19. What is meant by equilibrium, static equilibrium, and equilibrant?

20. What is tension?