

## Summer Work

### Understanding Physics – Chapters 1 – 3

1. Explain how philosophy gave birth to the study that we now call physics.
2. Cite some key differences between the Greek viewpoint of motion and the Galilean model of motion.
3. How does one cast doubt on a theory? Provide your own example.
4. Explain how it appears that two heavy balls will fall through air at the same time, but a heavy ball and a feather do not fall at the same rate.
5. Equation 2:1 shows there is a direct/indirect relationship between velocity and time. The proportionality constant is called \_\_\_\_\_. In a graph of velocity vs. time, the best-fit would be a line/curve and the proportionality constant is the \_\_\_\_\_.
6. How are equations 2:5 and 2:6 merely special cases of equations 2:1 and 2:2 respectively?
7. A 3.0 kg ball rolls down an incline that is elevated 1.2 m off the ground. The length of the plane is 5.0 m. Cite the equation used for each problem and solve it.
  - a. What is the acceleration of the ball?
  - b. What is the ball's speed after 2.0 s?
  - c. How far has the ball rolled after 2.0 s?
8. Use a real example to differentiate between Newton's inertia and Aristotle's "natural place."
9. Cite two reasons, with your own examples, why the Newtonian idea of inertia can only exist in an idealized world.
10. How is  $8 + 8 = 0$  a valid statement in physics?
11. According to the 2<sup>nd</sup> law, for a constant mass, force and acceleration are \_\_\_\_\_ related.
12. A 15.0 N force is applied to a 2.5 kg book.
  - a. If the book is opposed by a 2.3 N of friction, what is the net force on the book?
  - b. What is the book's acceleration?
  - c. How fast will the book move after 1.5 s?
  - d. How far will it have moved after 1.5 s?
13. Why does a kick to a stone propel it through air at a great speed, while the same kick to a sofa will stub your toe?