

HOMework #1

NOTES:

- This homework is due by the beginning of class on Jan 28. It covers material in chapters 1 and 2.
 - You will need a calculator and lots of scrap paper.
 - Answers are to be recorded on a scantron that you will turn in. You may keep the questions (i.e., these sheets).
 - You may (should) use your book. You may even work with other students. However, you should not copy the answers of other students. The homeworks are exam prep, and so you need to be able to work these problems yourself. If you do not apply yourself and do your own work, you are not likely to perform well on the exams.
1. In mechanics, physicists use three basic quantities to derive additional quantities. Time is one of the three quantities. What are the other two?
 - a. length and force
 - b. power and force
 - c. length and mass
 - d. force and mass
 2. The ratio M/c of the metric prefixes “M” and “c” has what value?
 - a. 10^{10}
 - b. 10^8
 - c. 10^6
 - d. 10^4
 3. If the displacement of an object, x , is related to acceleration, a , according to the relation $x = Ba$, the constant, B , has what dimension of units?
 - a. inverse acceleration
 - b. length
 - c. inverse square time
 - d. square time

4. On planet Q the standard unit of volume is called the guppy. Space travelers from Earth have determined that one liter = 92.6 guppies. How many guppies are in 15 liters?
- 107 guppies
 - 0.162 guppies
 - 9.23 guppies
 - 1,389 guppies
5. A cement truck can pour 23 cubic yards of cement per hour. Express this in ft^3/min .
- $51.1 \text{ ft}^3/\text{min}$
 - $0.85 \text{ ft}^3/\text{min}$
 - $10.4 \text{ ft}^3/\text{min}$
 - $7.67 \text{ ft}^3/\text{min}$
6. Assume everyone in the China consumes on average one soft drink in an aluminum can every day. If there are 1.4 billion Chinese, how many tons of aluminum need to be recycled each year if each can weighs $1/16$ pound and one ton = 2000 pounds?
- 90,000 tons
 - 1.2 million tons
 - 5.6 million tons
 - 16 million tons
7. Which point is nearest the x axis?
- (-3, 4)
 - (4, 5)
 - (-5, 3)
 - (5, -2)
8. A 40 g ball traveling at 20.0 m/s is bounced off a brick wall and rebounds at 19.0 m/s. A high speed camera records this event. If the ball is in contact with the wall for 2.50 ms, what is the average acceleration of the ball during this time interval? (Hint: Note there is a change in direction.)
- $15,600 \text{ m/s}^2$
 - $9,050 \text{ m/s}^2$
 - $2,130 \text{ m/s}^2$
 - 8 m/s^2
9. Wile E. Coyote steps off a butte in the desert. The butte is 89 meters high. How much time does it take for him to hit the ground?
- 1.7 sec
 - 3.1 sec
 - 4.3 sec
 - 18 sec

10. Wile E. Coyote shoots a rocket straight up. It accelerates upward for 3 seconds with a net acceleration of $a = 25 \text{ m/s}^2$. What is the rocket's speed at the end of the 3 second burn?
- a. 25 m/s
 - b. 75 m/s
 - c. 113 m/s
 - d. 4 m/s
11. Wile E. Coyote shoots a rocket straight up. It accelerates upward for 3 seconds with an acceleration of $a = 25 \text{ m/s}^2$. After the rocket burn is finished, what acceleration does the rocket experience?
- a. none
 - b. $+g$
 - c. $-g$
12. Wile E. Coyote shoots a rocket straight up. It accelerates upward for 3 seconds with an acceleration of $a = 25 \text{ m/s}^2$. What is the maximum height attained by the rocket before it starts to fall back down?
- a. 32 m
 - b. 399 m
 - c. 1,290 m
 - d. 113 m