

## Physics Worksheet - Significant Digits

1. State the number of significant digits in each of the following numbers:

- |             |       |                         |       |                      |       |
|-------------|-------|-------------------------|-------|----------------------|-------|
| a. 2.54     | _____ | b. $4.5 \times 10^{12}$ | _____ | c. 32.06             | _____ |
| d. 0.02     | _____ | e. 5400                 | _____ | f. 2006              | _____ |
| g. 2.9910   | _____ | h. 0.00670              | _____ | i. 5600              | _____ |
| j. 809      | _____ | k. 290.                 | _____ | l. 0.066             | _____ |
| m. .0660    | _____ | n. .01010               | _____ | o. 200,000           | _____ |
| p. 200,000. | _____ | q. 1.00005              | _____ | r. $.50 \times 10^2$ | _____ |

2. Solve the following problems and give the answer in the correct number of significant digits:

- a.  $432.2 \text{ m} + 24.04 \text{ m} =$  \_\_\_\_\_
- b.  $324.54 \text{ cm} - 25.6 \text{ cm} =$  \_\_\_\_\_
- c.  $28.9 + 300.25 + 2.945 =$  \_\_\_\_\_
- d.  $54 \text{ m} \times 826 \text{ m} =$  \_\_\_\_\_
- e.  $82.3 \text{ m} \times 1.254 =$  \_\_\_\_\_
- f.  $(1.2 \times 10^6)(3.25 \times 10^4 \text{ m}) =$  \_\_\_\_\_
- g.  $\frac{32.6 \text{ kg}}{125.4 \text{ L}} =$  \_\_\_\_\_
- h.  $\frac{4.24 \times 10^{-3} \text{ kg}}{2.2 \times 10^{-4} \text{ L}} =$  \_\_\_\_\_
- i.  $9.0 \text{ cm} + 7.66 \text{ cm} + 5.44 \text{ cm} =$  \_\_\_\_\_

### ANSWERS:

- 1) a. 3      b. 2      c. 4      d. 1      e. 2      f. 4  
    g. 5      h. 3      i. 2      j. 3      k. 3      l. 2  
    m. 3      n. 4      o. 1      p. 6      q. 6      r. 2
- 2) a. 456.2 m      b. 298.9 cm      c. 332.1 g  
    d. 45000 m<sup>2</sup> (or  $4.5 \times 10^4 \text{ m}^2$ )      e. 103 m<sup>2</sup>  
    f.  $3.9 \times 10^{10} \text{ m}^2$       g. 0.260 kg/L      h.  $1.9 \times 10 \text{ kg/L}$   
    i. 22.1 cm

**PROBLEM 2 Graphical Analysis of Velocity and Acceleration**

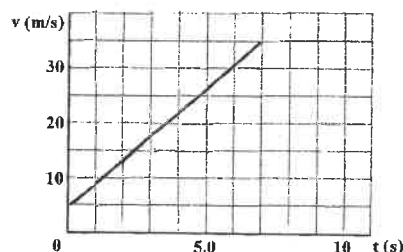
The data table shows the velocity of a radio-controlled car during a 7.0 s interval.

|         |     |     |     |     |     |     |     |     |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|
| t (s)   | 0   | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 |
| v (m/s) | 5.0 | 9.0 | 13  | 17  | 22  | 27  | 31  | 35  |

- Plot the data on a velocity versus time graph and draw a best-fit straight line.
- Find the area under the graph, and explain what the area represents.
- Find the slope of the line, and explain what the slope represents.
- What does the y-intercept of the graph represent?

**Solution**

a)



$$b) \text{ area} = \frac{1}{2} (5 + 35)(7.0) = 140 \text{ m}$$

The area under the graph represents the displacement of the car.

$$c) \text{ slope} = \frac{\Delta v}{\Delta t} = \frac{35 - 5}{7.0 - 0} = 4.3 \text{ m/s}^2$$

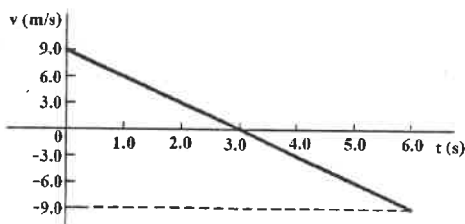
The slope of the line represents the acceleration of the car.

$$d) \text{ y-intercept} = 5.0 \text{ m/s}$$

The y-intercept of the graph represents the initial velocity of the car.

**RELATED PROBLEMS**

5. The graph is the velocity versus time graph for a toy train moving along a straight track.



- Find the acceleration of the toy train.
- Find the total displacement of the toy train for the complete trip.
- Based on this graph, sketch the position versus time graph for the toy train.

6. The data table shows the position of an object during a 5.0 s interval.

|                                  |   |     |     |      |      |     |
|----------------------------------|---|-----|-----|------|------|-----|
| t (s)                            | 0 | 1.0 | 2.0 | 3.0  | 4.0  | 5.0 |
| p (m)                            | 0 | 1.2 | 4.8 | 10.8 | 19.2 | 30  |
| t <sup>2</sup> (s <sup>2</sup> ) |   |     |     |      |      |     |

- Plot a graph of position versus time squared, and draw a best-fit straight line.
- Find the slope of the line.
- Based on the slope of the line, find the acceleration of the object.