

## Science 1206: Motion

### Worksheet #4: Scalar and Vector Quantities, Distance and Displacement, & Speed and Velocity

#### 1. Scalar and Vector Quantities

For each of the following, determine if the measurement is a scalar quantity or a vector quantity.

- |               |                 |
|---------------|-----------------|
| a. 50 km/h    | g. 453 s        |
| b. 6 km [N]   | h. 8700 m [W]   |
| c. 2000 J     | i. 1200 g       |
| d. 6 years    | j. 25 °C        |
| e. 20 m/s [S] | k. 100 km/h [W] |
| f. 400 N [E]  | l. 250 mol      |

#### 2. Distance and Displacement

For each of the following, calculate the resultant distance AND displacement.

- |                            |                          |
|----------------------------|--------------------------|
| a. -4 km to +5 km          | g. 4 km [E] to 10 km [W] |
| b. -4 km to -9 km          | h. 23 km [W] to 2 km [W] |
| c. +5 km to +11 km         | i. +2 km to +8 km        |
| d. +3 km to -5 km to +7 km | j. → +5 m to +16 m       |
| e. +8 km to -8 km          | k. -3 m to -5 m          |
| f. +2 km to -3 km to +3 km | l. 1 m [S] to 6 m [N]    |

#### 3. Speed and Velocity

For each of the following, calculate the resultant speed OR velocity, as required.

- What is the velocity of an airplane that experiences a displacement of 580 m [N] in 2.5 s?
- What is the speed of a train that travels a distance of 480 km in 8.0 h?
- What velocity is required for a truck moving along the highway to experience a displacement of 400 m [W] in 20 s?
- An ant moves a distance of 39.4 cm in 7.3 s. What is its speed?
- It takes a girl 720 s to ride her bike 1800 m. What is her speed?
- A dolphin swims 208 m [E] in 26 s. At what velocity must the dolphin swim?