

1.1 In Class or Homework Exercise

1. A person starts at a position of 5.0 km east of his house. After running for a period of time, he undergoes a displacement of 2.3 km east. What is his new position?

$$\vec{d}_i = 5.0 \text{ km} \qquad \Delta \vec{d} = \vec{d}_f - \vec{d}_i$$

$$\Delta \vec{d} = 2.3 \text{ km} \qquad 2.3 = \vec{d}_f - 5.0$$

$$\vec{d}_f = ? \qquad \vec{d}_f = \boxed{7.3 \text{ km}}$$

His new position is 7.3 km east of his house.

2. A person is driving a car along a straight highway. The car's position at 9:00 am is 13 km to the east of his home. The car's position at 10:30 am is 137 km to the east of his home. What is the displacement of the car?

$$\Delta \vec{d} = \vec{d}_f - \vec{d}_i$$

$$= 137 - 13$$

$$= \boxed{124 \text{ km}}$$

The positive answer indicates that the displacement is 124 km east.

3. A delivery person drives 83 km north to pick up a package, and then 34 km south to deliver the package.

- a. What was the delivery person's distance travelled?

$$\Delta d_t = \Delta d_1 + \Delta d_2$$

$$= 83 + 34$$

$$= \boxed{117 \text{ km}}$$

- b. What was the delivery person's displacement?

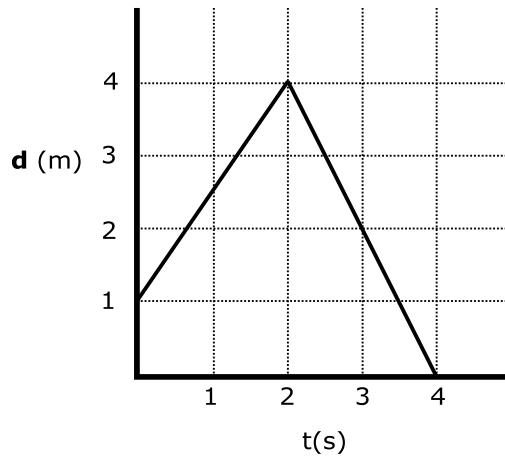
$$\Delta \vec{d}_t = \Delta \vec{d}_1 + \Delta \vec{d}_2$$

$$= 83 + (-34)$$

$$= 49 \text{ km}$$

$$\Delta \vec{d}_t = \boxed{49 \text{ km north}}$$

4. Answer the following questions based on the position-time graph shown below:



- a. What is the position of the object at 1.0 s?

$$\vec{d} = \boxed{+2.5 \text{ m from the origin}}$$

(note that the positive sign indicates the direction)

- b. What is the position of the object at 4.0 s?

$$\text{The object is at the origin at 4.0 s } (\vec{d} = \boxed{0.0\text{m}})$$

- c. What is the displacement of the object between 0 and 4.0 s?

$$\Delta\vec{d} = \vec{d}_f - \vec{d}_i$$

$$= 0 - 1.0$$

$$= \boxed{-1.0\text{m}}$$

or

$$\Delta\vec{d} = \Delta\vec{d}_1 + \Delta\vec{d}_2$$

$$= 3.0 + (-4.0)$$

$$= \boxed{-1.0\text{m}}$$

- d. What is the distance that the object has travelled between 0 and 4.0 s?

$$\Delta d_t = \Delta d_1 + \Delta d_2$$

$$= 3.0 + 4.0$$

$$= \boxed{7.0\text{m}}$$