GENERAL PHYSICS I – Question Bank 4
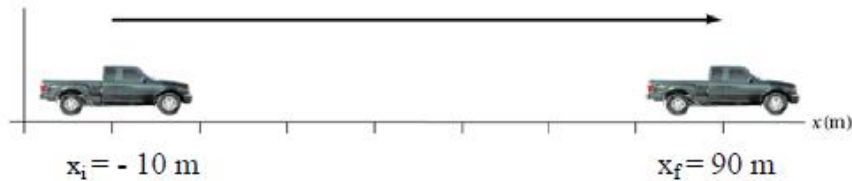## Subject: motion: position_ displacement_ distance

Question 1

1. The figure below shows the initial and final position of a truck.

a. Find the displacement of the truck in figure a.
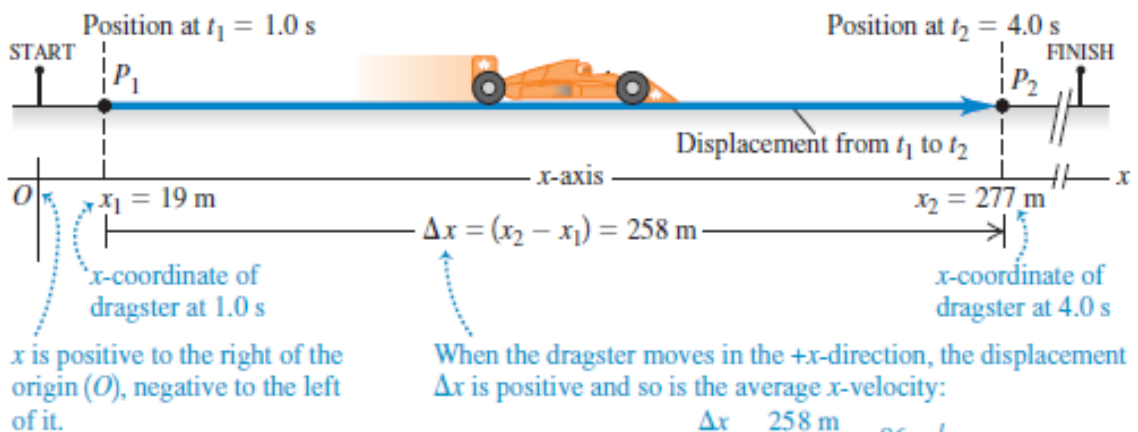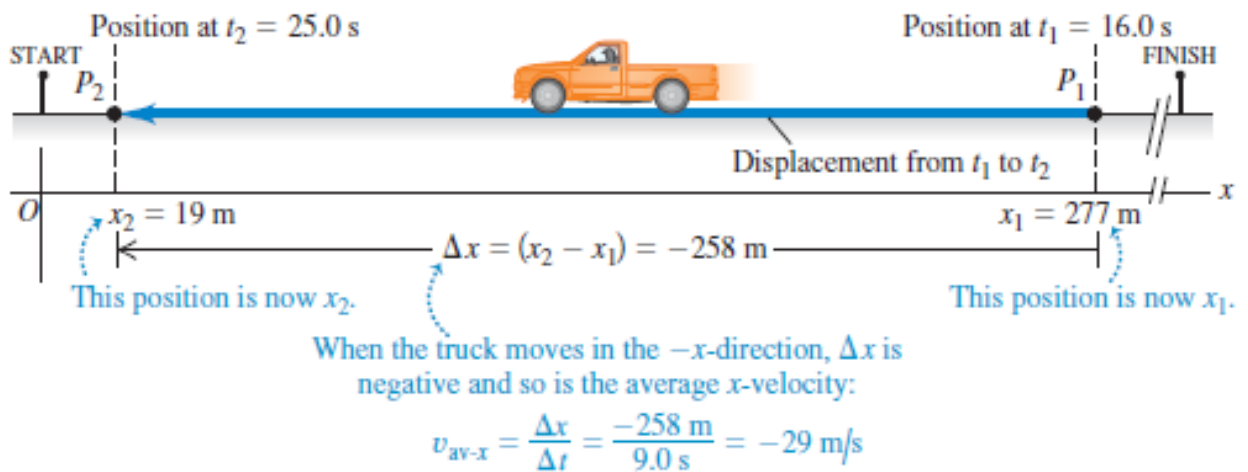
b. Find the displacement of the truck in figure b

$x_i = -10$ m $x_f = 90$ m

Figure a

$x_f = -20$ m $x_i = 180$ m

Figure   b

Question 2

From the figures below, find the average velocity.

2.1 Positions of a dragster at two times during its run.

Position at $t_1 = 1.0$ s

START

P_1

Position at $t_2 = 4.0$ s

FINISH

P_2

Displacement from t_1 to t_2

x-axis

O $x_1 = 19$ m

$\Delta x = (x_2 - x_1) = 258$ m

$x_2 = 277$ m

x-coordinate of dragster at 1.0 s

x-coordinate of dragster at 4.0 s

x is positive to the right of the origin (O), negative to the left of it.

When the dragster moves in the +x-direction, the displacement Δx is positive and so is the average x-velocity:
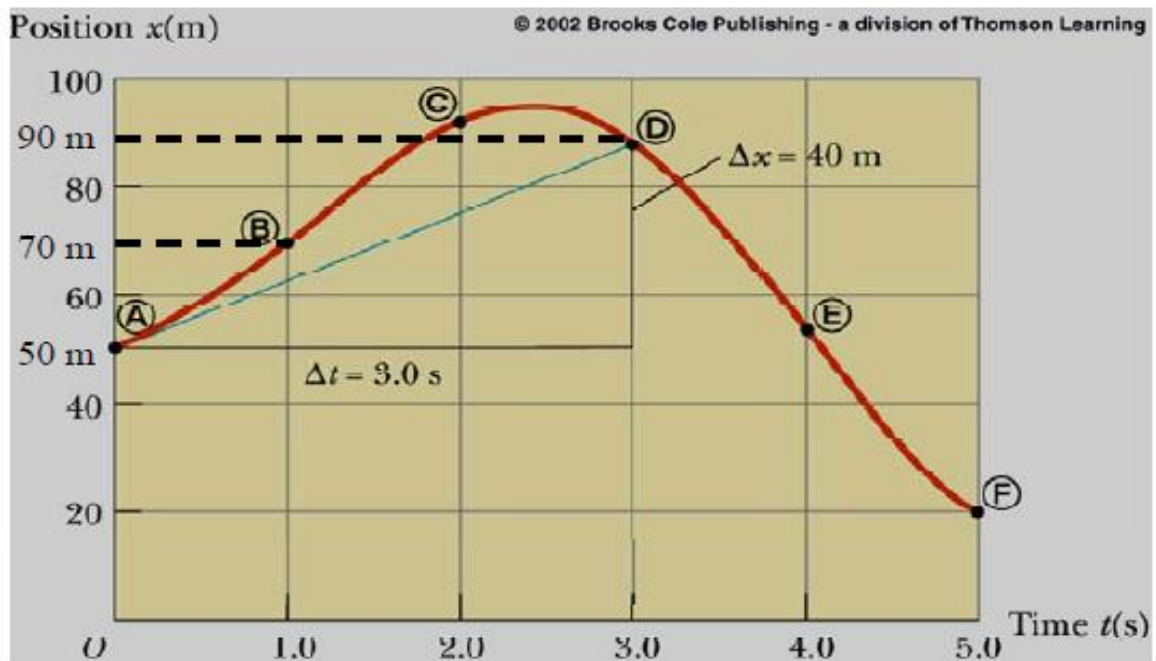
$$v_{av\text{-}x} = \frac{\Delta x}{\Delta t} = \frac{258 \text{ m}}{3.0 \text{ s}} = 86 \text{ m/s}$$

$$v_{av\text{-}x} = \frac{x_2 - x_1}{t_2 - t_1} = \frac{\Delta x}{\Delta t}$$

Position at $t_2 = 25.0$ s

START

P_2

Position at $t_1 = 16.0$ s

FINISH

P_1

Displacement from t_1 to t_2

0

$x_2 = 19$ m

$x_1 = 277$ m

x

$\Delta x = (x_2 - x_1) = -258$ m

This position is now x_2.

This position is now x_1.

When the truck moves in the $-x$-direction, Δx is
negative and so is the average x-velocity:

$$v_{av-x} = \frac{\Delta x}{\Delta t} = \frac{-258 \text{ m}}{9.0 \text{ s}} = -29 \text{ m/s}$$

Question 3. The graph below shows the change in position of an object with respect to time. Answer the following Questions using this graph.

Position x(m)

© 2002 Brooks Cole Publishing - a division of Thomson Learning

$\Delta x = 40$ m

$\Delta t = 3.0$ s

Time t(s)

a. What is the displacement of the object between 1s and 5s?

b. What is the displacement of the object between 3s and 5s?

c. What is the displacement of the object between 0 and 5s?

d. What is the displacement of the object between 2s and 4s?

e. What is the position of the object at position B?

f. What is the position of the object at position D?

g. What is the position of the object at position F?

h. What is the displacement of the object between A and B?

i. What is the displacement of the object between C and D?

j. What is the displacement of the object between B and F?

Question 4
A dog runs 9 km to east and then 3 km to west.
a) Find the displacement of the dog.
b) Find the distance taken by the dog.

Question 5
You normally drive on the freeway between San Diego and Los Angeles at an average speed of 150km/hr and the trip takes 2 h and 20 min. On a Friday afternoon, however, heavy traffic slows you down and you drive the same distance at an average speed of only 70km/hr. How much longer does the trip take?

Question 6
Starting from the front door of your ranch house, you walk 60.0 m due east to your windmill, and then you turn around and slowly walk 40.0 m west to a bench where you sit and watch the sunrise. It takes you 28.0 s to walk from your house to the windmill and then 36.0 s to walk from the windmill to the bench. For the entire trip from your front door to the bench, what are (a) your average velocity and (b) your average speed?