March 19, 2019

answers pg 393 #1-4a,5a,6ab,8,11a
calculating distance from v-t graphs

!!!Test next Tuesday Chp 10!!!

Warm-Up

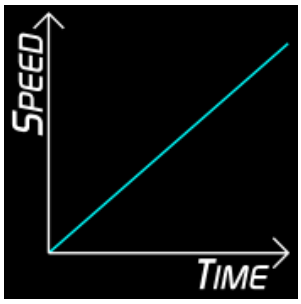
Which of the following graphs represent:

a. speed
b. acceleration

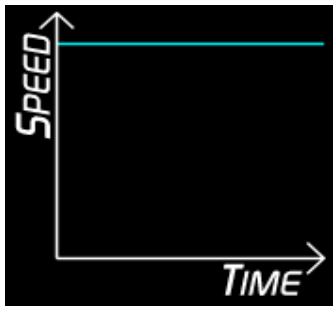
Which of the following show:

a. zero acceleration
b. increasing speed
c. constant speed

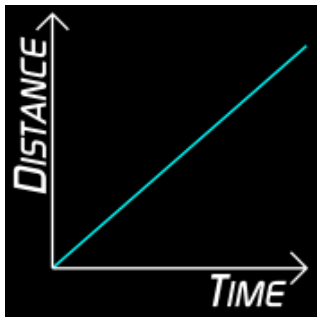
1.



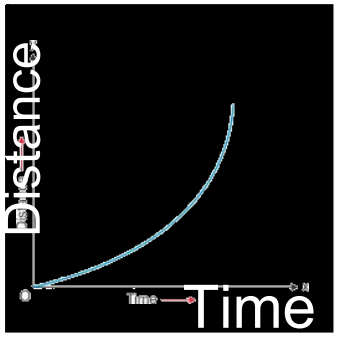
2.



3.



4.

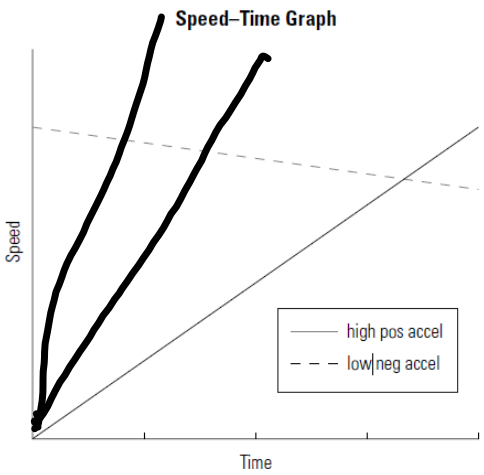


Answers pg 393 #1-4a,5a,6ab,8,11a

1. You can tell from a speed-time table when an object is accelerating because the values for speed will be increase as the values for time increase.

2. You can tell from a speed-time graph when an object is accelerating if the line on a speed-time graph has a positive slope (rises as the line moves to the right).

3.



4. a) On a speed-time graph the slope of the line communicates the acceleration

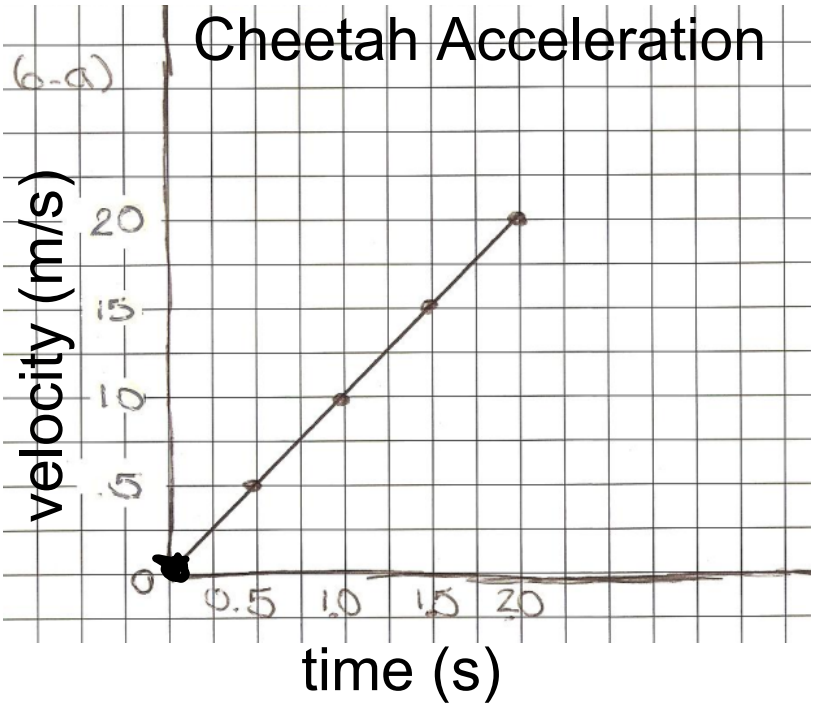
5. a) by looking at the slope of the lines in figure 7 Cathryn has the greater acceleration.

Cathryn

$a = \frac{v_f - v_i}{t} = \frac{6-3}{100-50} = \frac{3}{50} = 0.06 m/s^2$

Keir

$a = \frac{v_f - v_i}{t} = \frac{4-2}{100-50} = \frac{2}{50} = 0.04 m/s^2$



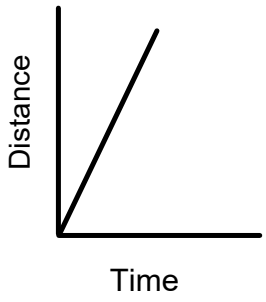
b) $a = \frac{v_2 - v_1}{t_2 - t_1} = \frac{y_2 - y_1}{x_2 - x_1}$

$a = \frac{20m/s - 0m/s}{2.0s - 0s}$

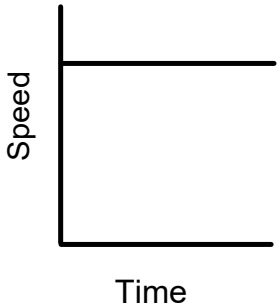
$a = \frac{20m/s}{2.0s}$

$a = 10 m/s^2$

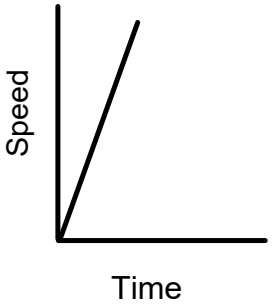
8. Distance time graph for constant speed



Speed time graph for constant speed



Speed-time graph for constant acceleration



11. a) Interval A

$$a = \frac{v_f - v_i}{t_2 - t_1} = \frac{80\text{m/s} - 0\text{m/s}}{10\text{s} - 0\text{ s}} = \frac{80}{10} = 8\text{m/s}^2$$

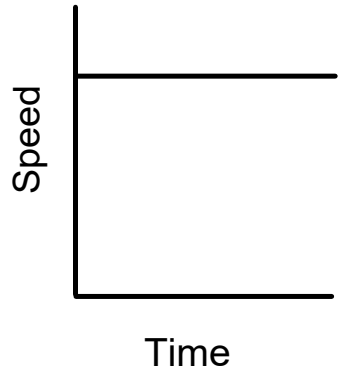
Interval B

$$a = \frac{v_f - v_i}{t_2 - t_1} = \frac{80\text{m/s} - 80\text{m/s}}{20\text{s} - 10\text{ s}} = \frac{0}{10} = 0\text{m/s}^2$$

Interval C

$$a = \frac{v_f - v_i}{t_2 - t_1} = \frac{40\text{m/s} - 80\text{m/s}}{30\text{s} - 20\text{ s}} = \frac{40}{10} = -4\text{m/s}^2$$

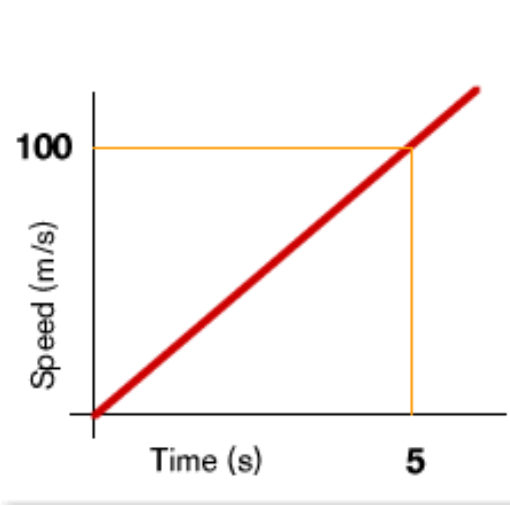
The area under the line in a speed-time graph is equal to the distance travelled during that time interval.



This distance can be found using the following formulas:

(for a graph with zero acceleration)

$D = vt$



(for a graph with constant acceleration or deceleration)

$D = \frac{1}{2} vt$

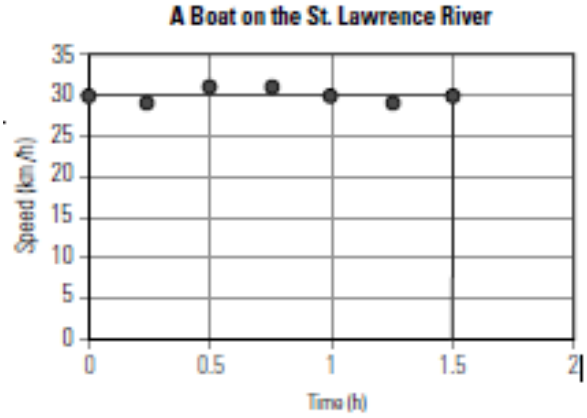
Sample Problem 1

A boat on the St. Lawrence River travels at full throttle for 1.5 h. From the area under the line of the speed-time graph (Figure 5), determine the distance travelled.

v = 30 km/h

t = 1.5 h

Δd = ?



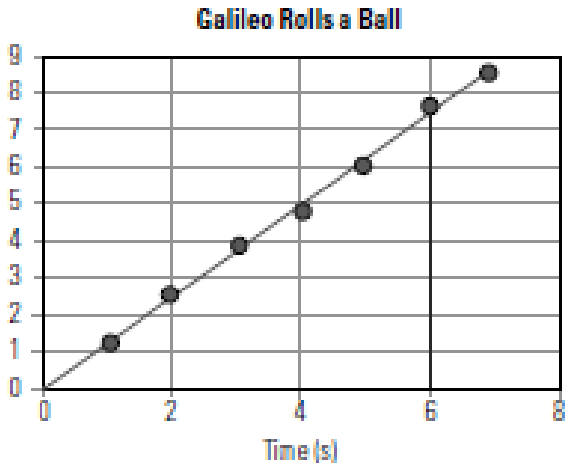
Speed–time graph for a boat

A = vt

A = (30km/h) (1.5h)

A = 45km

Based upon the area under the line of the graph, the distance travelled by
the boat is 45 km.



Speed–time graph for a ball

Sample Problem 2

Galileo rolls a ball down a long grooved inclined plane. According to a speed-time graph (Figure 6), what is the distance travelled in 6.0 s?

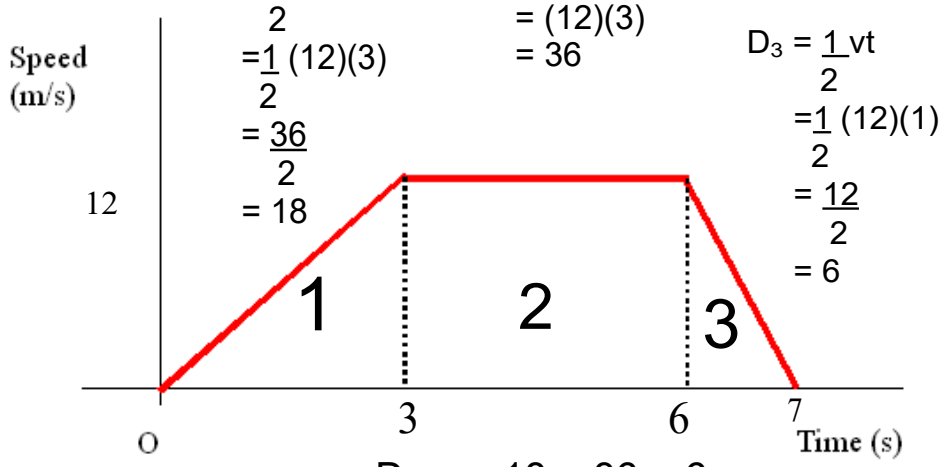
D =1/2 vt

= 1/2 (7.2m/s)(6.0s)

= 22 m

Based upon the area under the line of the graph, the distance travelled by the ball in 6.0 s is 22 m.

If the graph has multiple lines you can find the total distance travelled by finding the distance at each section and adding them together. This graph has 3 different sections.



$D_1 = \frac{1}{2}vt$
$= \frac{1}{2}(12)(3)$
$= \frac{36}{2}$
$= 18$

$D_2 = vt$
$= (12)(3)$
$= 36$

$D_3 = \frac{1}{2}vt$
$= \frac{1}{2}(12)(1)$
$= \frac{12}{2}$
$= 6$

$D_{total} = 18 + 36 + 6$
$= 60m$

Homework

Book Questions
pg 393
#4b, 5b, 6c