Friday, October 5/12
Science 10

Announcements

1. Understanding Concepts - Page 358: #3-6, 8

*Page 358: #7, 9
Page 359: #10

Quiz - Thursday Next Week
Average Velocity Problems

like

2. Section 9.6 - Investigation: Balloon Car Contest (Page 360)

Roles - at least one per team member
Table - Trial #, Distance (m), Time (s), Comments
- at least three trials must be included in the chart
Presentation - Car's Features and Performance
Participation

2
12
4
2
20

- Period 3 -> Winners: Robert, Jonathan, and Hilton
- Period 4 -> Winners: Jaeda, Stephen, Jade and Janie

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3. Video - Racing
Video - Human Body: Pushing The Limits: Strength

Problems.

1. list variables $V_{ave} =$ $t =$ $d =$ } ①

$V_{ave} \Rightarrow \frac{km}{h}, \frac{m}{s}$

$d \Rightarrow km, m$

$t \Rightarrow h, s$

2. $V_{ave} = \frac{d}{t}$ ①

3. rearrange formula ①

4. substitute values.

$V_{ave} = \frac{10km}{2h}$ <- ①

5. $V_{ave} = 5\frac{km}{h}$ } SD + unit ①

6. W.S. $\Rightarrow$ The average speed is $5\frac{km}{h}$. ①

$5\frac{km}{h}$ ①

Page 358

Understanding Concepts

1. **(a)** How is average speed different from instantaneous speed?
   (b) When are they the same?
2. A car and a truck travel along the same highway with the car moving faster than the truck.
   (a) How do their distances travelled compare after the same length of time?
   (b) How do their times compare after travelling the same distance?
3. Holidays might mean a multiday trip to be taken by foot, boat, train, or automobile. The Trans Canada Trail (**Figure 5**), for example, has become a popular hiking and cycling vacation route.

Figure 5

   (a) If two hikers walk the Trans Canada Trail for 6.0 h, and covered 31 km, what is their average speed for the day?
   (b) If three bike riders on the Trail cycle for 6.0 h one day, and cover 85 km, what is their average speed for the day?
   (c) Mary walked for 2.1 h along a portion of the Trans Canada Trail at a speed of 3.6 km/h. What distance did Mary travel?
   (d) What length of time would it take a hiker to travel a total distance of 25.0 km at an average speed of 5.2 km/h?
4. The cruise control of a car is set at 90.0 km/h. What distance is travelled by the car during 2.50 h?
5. Show that 1 m/s = 3.6 km/h.
6. Use the conversion factor in question 5 to convert
   (a) 92 km/h to m/s;
   (b) 21 m/s to km/h.
7. **(a)** The *Breitling Orbiter 3* balloon (**Figure 6**) set world records in 1999 by travelling 40 814 km in 19 d, 21 h, and 47 min. On March 1, 1999, the balloon lifted off from a village in the Swiss Alps. It eventually landed in Egypt on March 21. Calculate the average speed of the balloon.
   (b) Using the average speed you calculated in **(a)**, what length of time did it take the *Breitling Orbiter 3* to cross the Atlantic Ocean, a distance of 6670 km?
   (c) In the final leg of the round-the-world trip, the balloon flew for 18 h at an average speed of 210 km/h. How far did it travel?

Figure 6

8. In 1997, *Thrust SSC*, the world's fastest jet-engine car, travelled 604 m at an average speed of 341 m/s.
   (a) What length of time did this take?
   (b) Convert 341 m/s to kilometres per hour.
9. In a marathon race, one runner moving at 5.0 m/s passes a second runner moving at 4.5 m/s. What is the distance between the runners 10 min after the one runner passed the other?

Page 359

10. The "hand" of the Canadarm (**Figure 7**) used on the space shuttle can move up to 60 cm/s without a load attached.

(a) What is the minimum time for the Canadarm's hand to move 1.20 m?

(b) When the Canadarm is moving an object, the speed is slightly less than 60 cm/s. To move the same distance of 1.20 m, will the time be more or less than your answer to **(a)**? Explain your answer.

(c) The Canadarm takes 30 s to move some equipment from the cargo bay. During this time, the space shuttle moves 232 km through space. What is the speed of the space shuttle in kilometres per second? in kilometres per hour?

Figure 7

p. 358-359

3. a) $5.2\frac{km}{h}$ c) 7.6 km

b) $14\frac{km}{h}$ d) 4.8 h

#4. 225 km

#5. $1\frac{m}{s} \times \frac{3600s}{1h} \times \frac{1km}{1000m} = 3.6\frac{km}{h}$

$$1\frac{m}{s} = 3.6\frac{km}{h}$$

#6. a) $26\frac{m}{s}$

b) $76\frac{km}{h}$

#6. a) 1.77 s

b) $1227.6\frac{km}{h} \Rightarrow 1.23 \times 10^{3}\frac{km}{h}$

3SD

$\Rightarrow$ { $341 \times 3.6 = 1227.6$ and s }

P. 358

#7. a) $85.4 \frac{km}{h}$

b) 78.1h

c) $3.8 \times 10^3 km$

#9. $3.0 \times 10^2 m$

#10. a) 2.0s

b) Time ↑ as Value ↓.

c) $7.7 \frac{km}{s}$, $2.8 \times 10^4 \frac{km}{h}$