Tuesday April 12, 2011

Distance, speed and time

Warm-Up

Convert each of the following

a) 2 h into minutes 120min

b) 120km/h into metres per second 33m/s

Instantaneous Speed

is the speed at which an object is travelling at a particular instant.

i.e. if a car is stopped at a stop light its instantaneous speed is 0km/h
when a car passed a truck its speed was 100km/h at that specific point in time.

Constant Speed

if instantaneous speed remains the same over a period of time we say the car is travelling at a constant speed. If you are using cruise control on your car it is easy to travel at a constant speed.

the average speed of an object is the same as its instantaneous speed if that object has a constant speed.

Average Speed (v_{av})

= it is the total distance (d) divided by the total time (t) of the trip.

Formula : $v = \frac{\Delta d}{\Delta t} = \frac{d_2 - d_1}{t_2 - t_1}$

use $d_2 - d_1$ or $t_2 - t_1$ when you have more than one distance or more than one time

Example 1: Jenny skates to school a distance of 4.5km. Her journey takes 0.62 h. What is her average speed during the trip?

Step 1 :
Write down what you know on the left side with symbols and values. As well write what you want to find.

$d = 4.5\text{km}$
$t = 0.62\text{h}$
$v = ?$

Step 2 :
Use the formula to solve (Rearrange if necessary)

$$v = \frac{\Delta d}{\Delta t} = \frac{d_2 - d_1}{t_2 - t_1} = \frac{4.5\text{km} - 0\text{km}}{0.62\text{h} - 0\text{h}}$$
$$= 7.25806\ \text{km/h}$$
$$= 7.3\ \text{km/h}$$

Step 3 :
Write a sentence.

Jenny's average speed for her trip was 7.3 km/h.

Example 2:

Josh is trying to find his average speed when driving his car. His odometer reading starts at 250km and ends at 450 km and it take him 2.3h. What is his average speed?

Step 1 :

Write down what you know on the left side with symbols and values. As well write what you want to find.

$d_1 = 250\text{km}$ $t = 2.3\text{h}$

$d_2 = 450\text{km}$

Step 2 :

Use the formula to solve (Rearrange if necessary)

$$v = \frac{d_2 - d_1}{t} = \frac{450\text{km} - 250\text{km}}{2.3\text{h}} = \frac{200\text{km}}{2.3\text{h}} = 86.9565\text{km/h}$$

Step 3 :

Write a sentence.

Josh's average speed is 90km/h

90km/h

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