Speed, Velocity and Distance Calculations

Sort these quantities into **scalar or vector**

Temperature, speed, velocity, time, displacement, acceleration, distance, 7 km/hr, 10 m/s north, 300 m South, 500 m

|  |  |
| --- | --- |
| Scalar (no direction) | Vector (direction) |
|  |  |

Speed is the rate at which an object moves over a distance. If this measurement looks at the rate at which an object moves over a **displacement,** then we are calculating **velocity.**

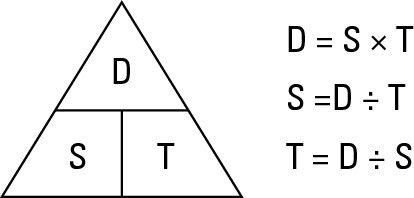
Average speed = distance travelled s= d  
 time travelled t

Average velocity = displacement v= d  
 time travelled t

**Examples**  
The average speed of an aeroplane that travels from Perth to Melbourne a distance of 2730 km by air in 3 hours is:

S=d 2730km = 910 km/hr \*you will get one mark for each of those steps  
 t 3 hours

The formula used to calculate average speed can also be used to work out the distance travelled or the time taken.



Cover up what you are wanting to calculate and the triangle will tell you the formula that you need.

**IN ORDER TO CALCULATE SPEED YOU MUST HAVE THE MEASUREMENTS IN**

**METRES and SECONDS OR KILOMETERS and HOURS so you will need to covert**

**Questions**

1. Determine the average speed of the following

a) a racehorse that wins the 3200m Melbourne Cup in a time of 200 s

b) A kangaroo fleeing from a Dingo, which bounds in a distance of 2500 m in 3 mins

c) A dolphin that manages to keep up with speeding boat for a distance of 2km for a period of 3 mins

d) A sea turtle that is able to maintain its maximum speed for 0.5 hours. In that time it can swim a distance of 16km

e) An Olympic swimmer who completes a 1500 m training swim in 16 mins

f) A mosquito that flies a distance of 2 metre in 4 seconds

**Sometimes you can covert a speed.**

**metres per second to km/hr x 3.6**

**km/hr to m/s ÷ 3.6**

2. How long would it take you to walk from Melbourne to Sydney, a distance of 900 km if you walked at an average speed of

a) 5km/hr without stopping

b) 5km/hr for 10 hours per day

c) 1.5 m/s without stopping (Hint convert to km/hr first)

3. How far can a snail crawl if it moves at an average speed of 0.0013 m/s for

a) 3 mins

b) 3 hours?

4. In a heat of a swimming trial, a swimmer swims the 100 m breaststroke event in 68 s. The event is completed in a pool that is 50 m long. She finishes the event at the same end of the pool from which she started. If she begins the event by swimming due north, and takes 35 s to swim the first 50 m, calculate her:

a) Average speed for the whole swim

b) Average velocity for the first 50 metres

c) Average velocity for the whole swim

5. A swimmer completed a 1500 m race in 870 s. Calculate the swimmers average speed in

a) m/s

b) km/hr