Name: Date:

1. **State** which unit(s) could be used to measure speed.
   - **A** year per metre
   - **B** millimetre per day
   - **C** metre per kilogram
   - **D** kilometre per second

2. **Recall** facts about motion by stating whether the following statements are true or false.
   - **a** Distance is a vector quantity.
   - **b** The SI unit for length is the kilometre.
   - **c** Speed can be converted from metres per second to kilometres per hour by multiplying by 3.6.
   - **d** The area below a speed–time graph is the distance travelled by an object.

3. Jo's displacement is 100 m north. **Explain** what this means.

   Describe a journey in which your displacement is zero, and another in which it is not zero.

   Raj jogs at a constant rate of 5 km/h around the block of streets around his home. Jane thinks that Raj's speed and velocity remain constant. **Explain** whether Jane is correct.

4. **Calculate** the:
   - **i** distance travelled
   - **ii** displacement of each object shown in Figure 8.1.17.

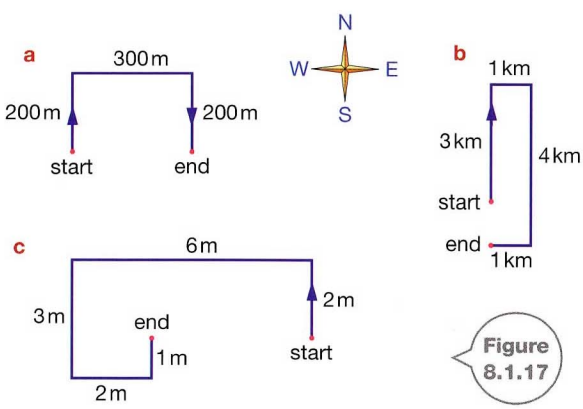


Figure 8.1.17

5. **Calculate** the missing values to complete the table.

Animal	Speed (m/s)	Speed (km/h)
Cheetah		102
Red kangaroo	17.5	
Giraffe		56
Emu		50
Human	7.5	
Elephant		24
Chicken	4	
Giant tortoise	0.075	

6. **Calculate** the average speed of each of the following in the units specified in the brackets.
   - **a** Tim hikes 10 km in 2 hours in the bush (km/h).
   - **b** A frog leaps 16 m in 4 seconds (m/s).
   - **c** A racing car travels 3 km around a circuit in 6 minutes (km/h).

7. Figure 8.1.18 shows the displacement of six objects over a time period. **Identify** which graph/s represent:
   - **a** a stationary object
   - **b** an object moving backwards
   - **c** the fastest forward-moving object
   - **d** the fastest backward-moving object.

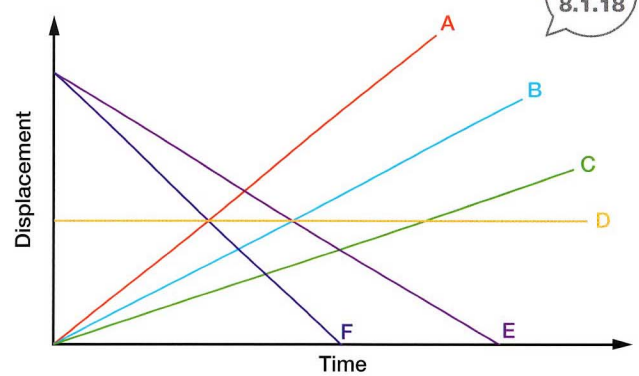
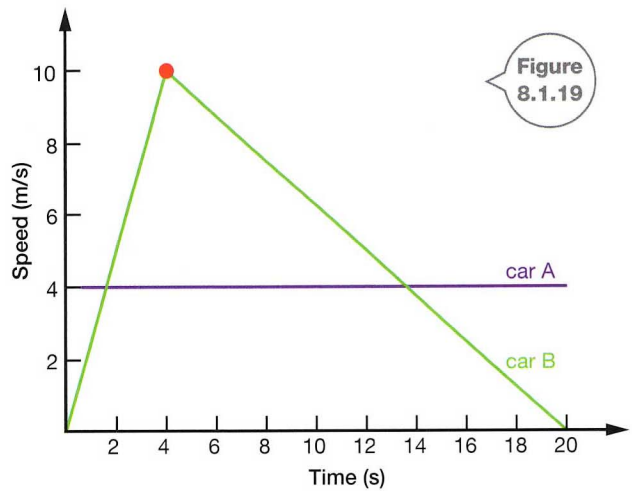


Figure 8.1.18

8. The driver of a car travelling at 80 km/h turned a bend and saw a broken-down car ahead. He took 0.75 second to react, and after he braked the car travelled a further 39.2 metres before stopping. **Calculate** the total distance taken for the car to stop. (Hint: Convert the speed of the car into m/s.)

9. **Compare** distance and displacement.

10. Figure 8.1.19 shows the motion of car A and car B. **Analyse** these graphs to determine which car travels further in 20 seconds.



11. Catarina is on yard duty collecting litter at school. She walks 300 m north, then 100 m west, finally turning to walk 300 m south. The journey takes 5 minutes.
    - **a** **State** the total distance travelled.
    - **b** **Calculate** Catarina's average speed in m/s.
    - **c** **Construct** a diagram of Catarina's journey.
    - **d** **State** her displacement.
    - **e** **Calculate** Catarina's average velocity.

12. Design an experiment that uses a video camera or motion detector to record the motion of a number of objects. Examples include:
    - wind-up or battery-operated toys released from a starting point
    - a cyclist riding along a street
    - students in a running race.

    Use your recording to assist you to construct an approximate distance–time graph for each object.