

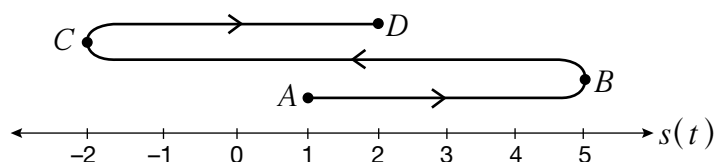


## Practice – 1

Once you feel confident with distance, displacement, and velocity, complete problems 1 to 5. Check your answers by going to the Solutions tab in Moodle.

**Instructions:** Answer each of the following practice questions on a separate piece of paper. Step by step solutions are provided under the Solutions tab. You will learn the material more thoroughly if you complete the questions before checking the answers.

- The diagram shows an object travelling in a straight line at one second intervals.



At  $t = 0$  s, the position of the object is at Point A, or at +1, measured from the origin.  
 At  $t = 1$  s, the position of the object is at Point B, or at +5, measured from the origin.  
 At  $t = 2$  s, the position of the object is at Point C, or at -2, measured from the origin.  
 At  $t = 3$  s, the position of the object is at Point D, or at +2, measured from the origin.

- Determine the total distance travelled between  $t = 0$  s and  $t = 3$  s.
  - Find the displacement of the object from  $t = 0$  s to  $t = 3$  s.
- City A is 150 km from City B and City B is 250 km from City C. The three cities are in a straight line, as shown in the diagram. A car leaves City A at 8:00 am and arrives at City B at 9:30 am. After a quick stopover, the same car leaves City B at 10:00 am and arrives at City C at 12:30 pm. It leaves City C at 1:00 pm and returns to City B at 4:00 pm.



Find the car's

- displacement,
- average velocity, and
- average speed.

3. A car is driven along a straight highway for three hours at 110 km/h, and then for four hours at 100 km/h.

Determine

- the displacement and
  - the average velocity of the vehicle.
4. An object is moving upward, away from a fixed point. The position  $s(t)$ , in metres, of the object with respect to the fixed point is a function of time  $t$ , in seconds, given by  $s(t) = -5t^2 + 50t + 25$ , where  $t \geq 0$ .
- What is the velocity at any time  $t$ ?
  - What is the velocity at  $t = 1$ ?
  - Find  $t$  when the object reaches its maximum displacement.
  - What is the maximum displacement?
  - What is the average velocity from  $t = 0$  to  $t = 2$ ?
5. An object is moving in a straight line from a fixed point. The displacement, in metres, which is a function of time, in seconds, is given by  $s(t) = t^3 - 9t^2 + 24t$ .
- Find the average velocity from  $t = 1$  to  $t = 4$ .
  - What is the velocity at any time  $t$ ?
  - What is the velocity when  $t = 3$ ?
  - Find  $t$  when  $s(t)$  is a minimum.
  - What is the minimum of  $s(t)$ ?
  - Using a number line, draw a diagram to represent the motion of the object.