

5 A child is running up and down a path. A simplified model of the child's motion is as follows:

- he first runs north for 5 s at 4 m s^{-1} ;
- he then suddenly stops and waits for 8 s;
- finally he runs in the opposite direction for 7 s at 3.5 m s^{-1} .

(a) Taking north to be the positive direction, sketch a velocity-time graph for this model of the child's motion. **[2]**

Using this model,

(b) calculate the total distance travelled by the child, **[2]**

(c) find his final displacement from his original position. **[1]**