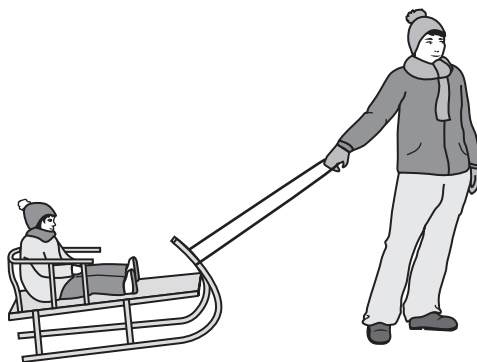


- 8 (a) The diagram shows a man pulling a child on a sledge.



The mass of the child and sledge is 45 kg.

The unbalanced force acting on the sledge is 49 N.

- (i) State the equation linking unbalanced force, mass and acceleration.

(1)

- (ii) Calculate the acceleration of the child and sledge.

(2)

acceleration = ..... m/s<sup>2</sup>

- (iii) Suggest a reason why the man must pull the sledge with a force that is greater than 49 N.

(1)

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(b) The sledge is then placed at the top of a hill.

When it slides down the hill, it accelerates at  $1.3 \text{ m/s}^2$ .

The sledge accelerates from rest for 2.4 s.

(i) State the equation linking acceleration, velocity and time.

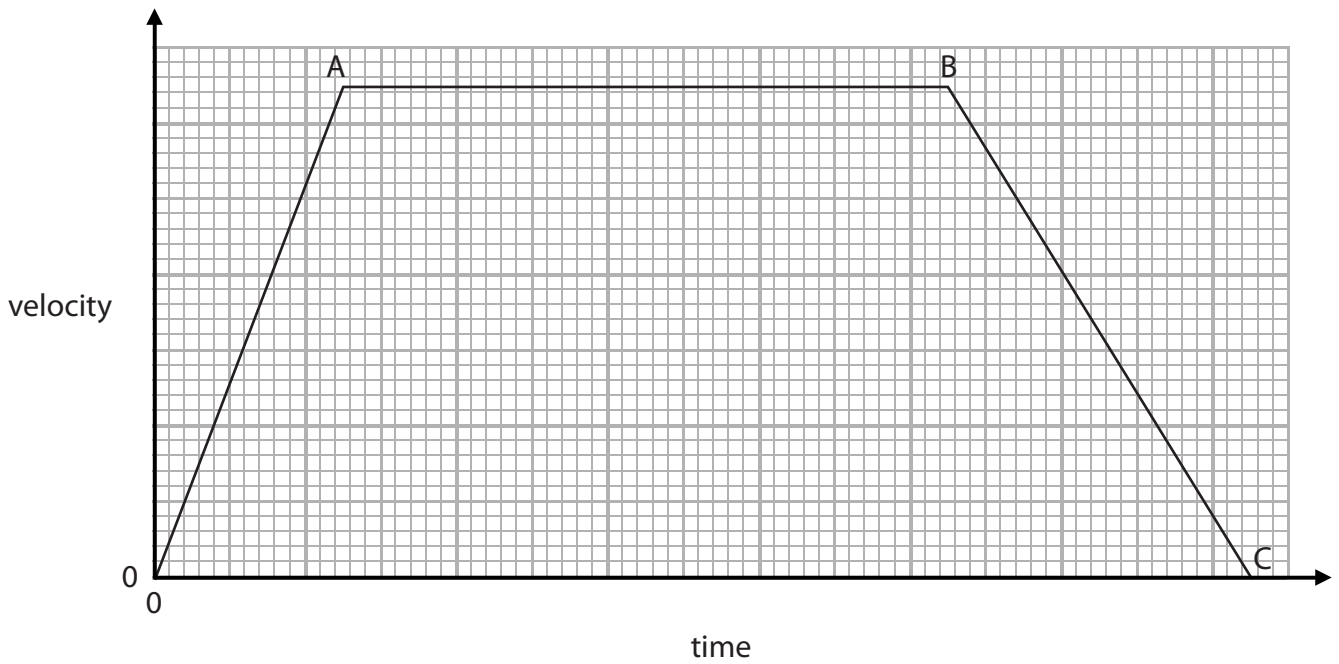
(1)

(ii) Show that the sledge reaches a speed of approximately 3 m/s after it has accelerated for 2.4 s.

(2)



(c) This velocity-time graph shows the motion of another sledge.



- (i) Which feature of the velocity-time graph shows the distance travelled by the sledge? (1)

- (ii) Describe the motion of the sledge during the journey shown by the velocity-time graph. (3)

(Total for Question 8 = 11 marks)

