
- 7

- (a)** Find the acceleration of P when $t = 2$. [2]

[2]

This image shows a full page of white paper with ten horizontal dashed lines, evenly spaced from top to bottom. The lines are thin and black, typical of handwriting practice paper. There are no margins, text, or other markings on the page.

- (b)** Find the total distance travelled by P in the first 3 seconds of its motion. [5]

[5]

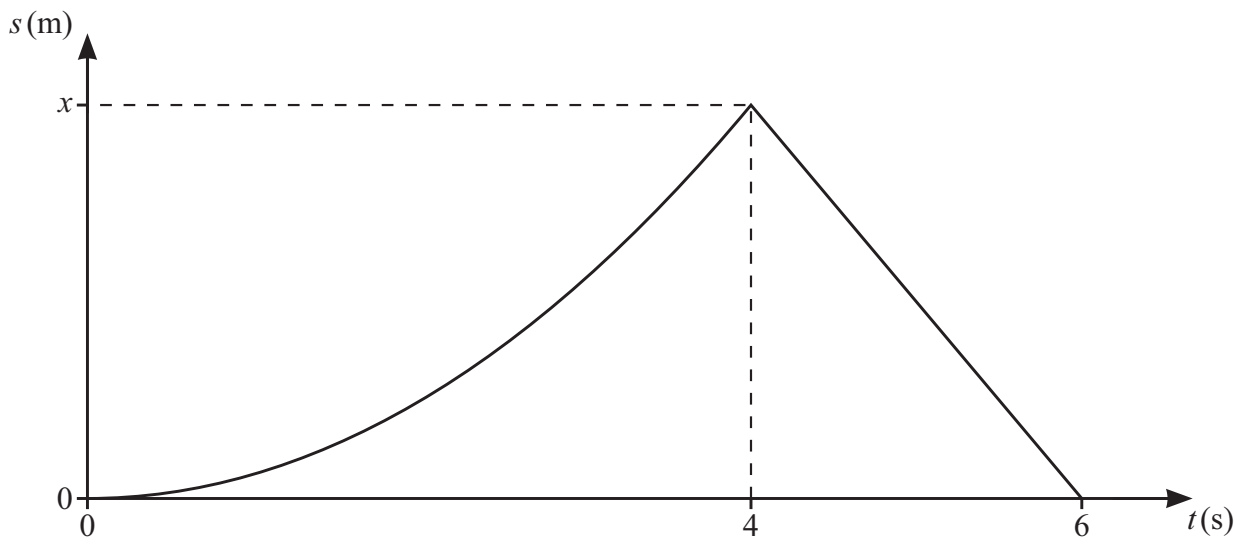
[illegible]

(c) Determine whether P returns to O . [2]

②

42 _____

1



The diagram shows the displacement-time graph for the motion of a particle. The particle starts from rest at a point O and travels with constant acceleration $a \text{ m s}^{-2}$, taking 4 s to move a distance of $x \text{ m}$. The particle then returns to O with constant speed of 40 m s^{-1} , over a period of 2 s.

Find the value of x and the value of a .

[3]

[illegible]

- 3

(a)

[2]

.....

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T

- (b)

[4]

This image shows a full page of white paper with horizontal dashed lines, typical of primary-ruled notebook paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings present.

- (ii)

[2]

.....

.....

.....

4

(2)

[4]

[illegible]

When P and Q collide, they coalesce.

(b) Find the speed of the combined particle at the instant that it reaches the ground. [5]

Handwriting practice sheet with 20 rows of dotted lines for tracing and writing.

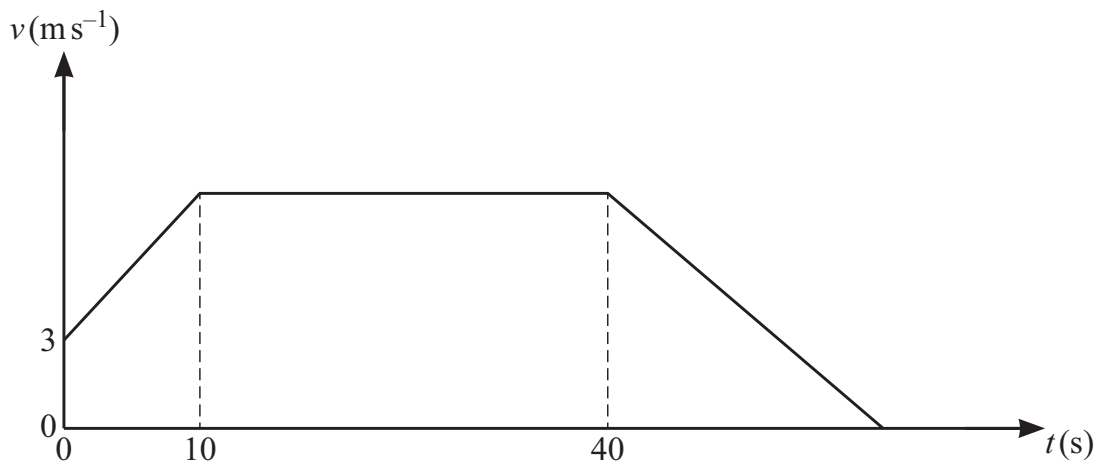
- 6** A particle starts from rest at a point O . The acceleration of the particle at time t s after leaving O is $a \text{ m s}^{-2}$, where

$$a = 2(t+1)^{-\frac{1}{2}} - 1 \text{ for } t \geq 0.$$

Find the distance that the particle travels from O until the time at which its acceleration is zero. [8]

This image shows a full page of a handwriting practice worksheet. It consists of multiple rows of horizontal dashed lines spaced evenly down the page, providing a guide for letter height and placement. The background is plain white, and there are no margins or additional markings.

3



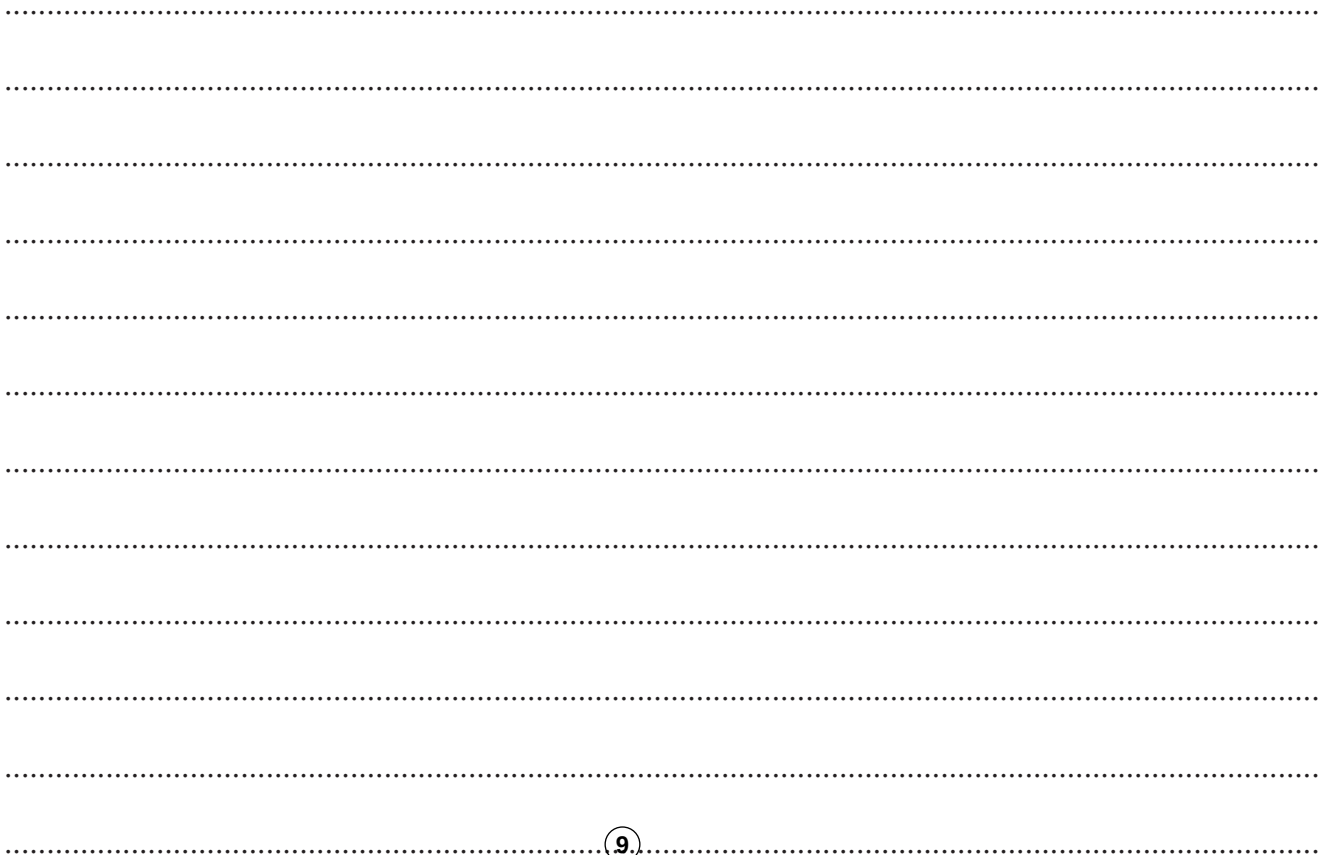
The diagram shows the velocity-time graph of the motion of a cyclist. The graph consists of three straight line segments. The cyclist passes a point O with speed 3 m s^{-1} and then accelerates for 10 s with constant acceleration 0.5 m s^{-2} . He then travels at constant speed for 30 s before decelerating, coming to rest at point P , covering a distance of 80 m whilst decelerating.

- (a)** Find the total time taken for the journey from O to P .

[3]

[illegible]

- [4]



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- 7

A particle X moves along a straight track, starting from a point O at time $t = 0$. The displacement of X from O at time t s is s m, where $s = 3t^{\frac{3}{2}} - 6t$.

(a) Find the time at which X is instantaneously at rest, and hence find the total distance travelled by X between $t = 0$ and $t = 16$. [6]

10

A second particle Y moves along another straight track, starting from a point P at time $t = 0$. The acceleration of Y at time ts is $a \text{ ms}^{-2}$, where $a = 0.8 - 0.6t$. The velocity of Y when it leaves P is 7.5 ms^{-1} .

- (b)** When the velocity of Y is -9.6 ms^{-1} , show that the displacement of X from O is equal to the displacement of Y from P . [7]

[illegible]

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

[illegible]