The Other Constant-Acceleration Formulae

Specification: AQA 7357: P1, Q1, Q3 · Edexcel 9MA0: 6.1, 7.1, 7.3

HOMEWORK Consolidation

1 A particle has initial velocity 5 m s^{-1} and constant acceleration 1.2 m s^{-2}. Find its velocity after it has travelled 30 m.

AQA Q3 · Edexcel 7.3

2 A car travelling at 30 m s^{-1} brakes with constant deceleration 7.5 m s^{-2}. Find its stopping distance.

AQA Q3 · Edexcel 7.3

3 A car accelerates uniformly from 54 km h^{-1} to 90 km h^{-1} over a distance of 200 m. Find its acceleration.

AQA P1, Q3 · Edexcel 6.1, 7.3

4 A particle has initial velocity 3 m s^{-1} and constant acceleration 0.5 m s^{-2}. How far does it travel in 12 s?

AQA Q3 · Edexcel 7.3

5 A particle accelerates uniformly at 0.75 m s^{-2} for 8 s, reaching 9 m s^{-1}. How far does it travel in this time?

AQA Q3 · Edexcel 7.3

6 A particle has constant acceleration 1.6 m s^{-2}. It travels 85 m in 5 s.

(a) Find its initial velocity.
(b) Find its final velocity.

AQA Q3 · Edexcel 7.3

7 A particle moving at 16 m s^{-1} decelerates uniformly at 2 m s^{-2}.

(a) Find the distance it travels before it stops.
(b) Find its speed when it has travelled half of this distance.

AQA Q3 · Edexcel 7.3

8 A particle passes O with velocity 4 m s^{-1} and constant acceleration 3 m s^{-2}. Find the time it takes to travel 40 m, and its velocity then.

AQA Q3 · Edexcel 7.3

9 A particle moves with constant acceleration through A, B and C in that order. Its speed is 4 m s^{-1} at A, 8 m s^{-1} at B and 10 m s^{-1} at C. AB = 48 m.

(a) Find its acceleration.
(b) Find the distance BC.
(c) Find the time it takes from A to C.

AQA Q3 · Edexcel 7.3

10 Starting from $v = u + at$ and $s = \frac{1}{2}(u + v)t$, show that $v^2 = u^2 + 2as$.

AQA Q3 · Edexcel 7.3 (derive the formulae)

11 *AQA-style*. A cyclist moves along a straight road with constant acceleration a m s^{-2}. She passes the points P, Q and R in that order. She takes 3 s to travel from P to Q and 4 s to travel from Q to R. PQ = 27 m and QR = 64 m. Her speed at P is u m s^{-1}.

(a) Show that $u + 1.5a = 9$. [2 marks]
(b) Find a and u. [3 marks]
(c) Find her speed at R. [2 marks]

AQA Q3 · Edexcel 7.3 · AQA-style

12 *Edexcel-style*. A car moves along a straight horizontal road with constant acceleration. It passes three points A, B and C in that order, where AB = 90 m and BC = 150 m. Its speed at B is 12 m s^{-1} and its speed at C is 18 m s^{-1}. Find

(a) the acceleration of the car, (3)
(b) the time it takes to travel from A to C. (3)

AQA Q3 · Edexcel 7.3 · Edexcel-style