

Section 3: The constant acceleration formulae

Exercise level 1

In this exercise take $g = 9.8 \text{ m s}^{-2}$.

- Find v when $u = 5$, $a = 3$, $t = 2$.
 - Find v when $u = 4$, $a = -2$, $t = 3$.
 - Find s when $v = 10$, $u = 4$, $a = 6$.
 - Find s when $u = 15$, $a = -5$, $t = 3$.
- Find a when $u = 6$, $s = 4$, $v = 1$.
 - Find a when $s = 12$, $u = 3$, $t = 4$.
 - Find u when $v = 0$, $a = 4$, $s = -12$.
 - Find u when $s = 10$, $t = 2$, $a = -4$.
- If $u = 5$, $a = 2$ and $t = 3$ find v and s .
 - If $v = -18$, $s = -64$ and $t = 8$ find a and u .
- In each case, decide which of the *suvat* equations is most useful.
 - Given v , a , s ; find u
 - Given u , v , a ; find t
 - Given u , v , s ; find t
 - Given u , s , t ; find a
 - Given u , s , t ; find v
- A car accelerates from rest uniformly to 17 ms^{-1} in 30 seconds. Find the distance travelled in this time.
- A car starting from rest reaches a speed of 80 km h^{-1} in 10 s.
 - Find the acceleration of the car in ms^{-2}
 - Find the distance travelled in this time.
- A ball is thrown vertically upwards at 3 m s^{-1} from 1 m above ground level.
 - Write down an equation that models the height of the ball above the ground after t seconds (while the ball is in the air).
 - Use your answer to part (i) to find the time it takes the ball to reach the ground.
 - How fast is the ball moving just before it hits the ground?
 - State an assumption that you have made.
- A car is travelling along a straight road. It accelerates uniformly from rest to a speed of 18 m s^{-1} and maintains this speed for 8 minutes. It then decelerates uniformly to rest. If the acceleration and deceleration are 3 m s^{-2} and 6 m s^{-2} respectively, find the total journey time and the total distance travelled during the journey.
- A circus artist drops a ball from a high wire. The ball takes 1.5 s to reach the ground.
 - Find the height of the high wire above the ground.
 - Write an expression for the speed of the ball t seconds after it is dropped where $0 \leq t \leq 1.5$.
 - How fast is the ball moving as it hits the ground?