Kinematics Equations Worksheet

Level: GCSE / AP Physics 1 / IB SL | Difficulty: Intermediate | Topic: Mechanics

Practice the four kinematic equations (SUVAT) with this set of 12 progressively challenging problems. Includes a full worked answer key. Ideal for GCSE, AP Physics 1, and IB Physics students.

Equations you will need

v = u + at	Final velocity from initial velocity, acceleration, and time
s = ut + 1/2at^2	Displacement from initial velocity, time, and acceleration
v^2 = u^2 + 2as	Final velocity squared (no time needed)
s = 1/2(u + v)t	Displacement from average velocity and time

Symbol key

Symbol	Quantity	Unit
s	displacement	m (metres)
u	initial velocity	m/s
v	final velocity	m/s
a	acceleration	m/s^2
t	time	s (seconds)

Practice problems

1. A car accelerates from rest at 3 m/s^2 for 8 seconds. Find its final velocity.

2. A cyclist travelling at 5 m/s accelerates uniformly to 15 m/s in 4 seconds. Calculate the acceleration.

3. A stone is dropped from a cliff and falls for 3 seconds. How far does it fall? (g = 9.8 m/s^2)

4. A train decelerates from 30 m/s to rest over a distance of 450 m. Find the deceleration.

5. A ball is thrown vertically upward at 20 m/s. How high does it rise? (g = 9.8 m/s^2)

6. A car travels at 25 m/s and brakes uniformly, stopping in 5 seconds. Find the braking distance.

7. An object accelerates from 4 m/s to 12 m/s over 32 m. Find the acceleration.

8. A skydiver falls from rest. After 4 s of free fall, find her velocity. (g = 9.8 m/s^2)

9. A car accelerates from 10 m/s at 2 m/s^2 for 6 s. Find the distance covered.

10. A rocket reaches 200 m/s from rest with acceleration 8 m/s^2. Find the time taken.

11. A ball rolls down a ramp with constant acceleration. It covers 9 m in the first 3 s starting from rest. Find the acceleration.

12. A car travels at 20 m/s, then accelerates at 1.5 m/s^2 for 8 s. Find the final velocity and the total distance.