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# TEST OUTLINE - KINEMATICS

- 20 m/c questions
- One graph with a curve (3 marks).
- One graph → specific equation (6 marks)
- 4 calculation questions (13 marks)

+ 1 BONUS QUESTION

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- distance vs. displacement
- speed vs. velocity
- average speed = $\frac{\text{total distance}}{\text{total time}}$ $\quad \bar{v} = \frac{\Delta d}{\Delta t}$

## Displacement - Time graphs

↳ Slope = velocity
- positive vs. negative
- faster vs. slower, stationary
- constant vs. changing

- average velocity: slope of line connecting start time + finishing time.
- Instantaneous velocity: slope of tangent at that time.

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## Velocity - Time Graphs:

↳ slope = acceleration
↳ positive slope (speeding up); negative slope (slowing down)
↳ steeper slope = greater acceleration
↳ horizontal slope = constant velocity

↳ average accel.: slope of line connecting 2 points
instantaneous accel: slope of tangent

↳ displacement: area under the line

↳ General form: $v_f = at + v_i$
($a$: slope/acceleration; $v_i$: y-intercept/initial velocity)

4 Kinematics Equations

acceleration

## 4 Kinematics Equations

$$v_f = v_i + at \qquad d = v_i t + \tfrac{1}{2} a t^2$$

$$d = \left(\frac{v_f + v_i}{2}\right) t \qquad v_f^2 = v_i^2 + 2ad$$

↳ For all equations, $a = -9.81\ m/s^2$ ALWAYS for object in freefall at Earth's surface.