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3 Exam Questions
Yr 1 – Constant Acceleration

(1) A ball is thrown vertically upwards with speed $10ms^{-1}$ from a point X metres above the ground. Given that that the ball hits the ground 3 seconds later:
(a) Find the value of X
(b) Show that the ball is never more than 20m above the ground.
(c) Explain the modelling assumptions you have made in your answers.
(2) A particle passes through the origin with velocity $5ms^{-1}$ and travels in the positive x direction with constant acceleration. The particle is at instantaneous rest after 4 seconds. Find the total distance that the particle travels in the first 12 seconds after passing through the origin for the first time.
(3) Car A and Car B are level on a start line in a race. Car A starts and is followed 2 seconds later by Car B. Car A moves from rest with constant acceleration for 4 seconds until it reaches a speed of $12ms^{-1}$. Car A then maintains this speed. Car B accelerates from rest for 30 seconds to reach a speed of Vms^{-1} and then maintains this speed. Car B passes Car A at the point X, T seconds after Car A started.
(a) Sketch a velocity time graph on the same set of axes for the motion of the two cars.
(b) Given that point X is 480m from the start line, find the value of V.

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