

Multiple Particle Kinematics

1. Two stones are thrown from the same point at the same time, one vertically upwards with speed 30 m/s, and the other vertically downwards at 30 m/s. Find how far apart the stones are after 3 seconds.
2. A car A , travelling at a constant velocity of 25 m/s, overtakes a stationary car B . Two seconds later car B sets off in pursuit, accelerating at a uniform 6 m/s^2 . How far does B travel before catching up with A ?
3. A ball A is thrown vertically upwards at 25 m/s from a point P . Three seconds later a second ball B is also thrown vertically upwards from the point P at 25 m/s. Taking the acceleration due to gravity as 10 m/s^2 calculate
 - (a) how long A has been in motion when the balls meet,
 - (b) the height above P at which A and B meet.
4. A motorbike and car set off at the same time from traffic lights. The car accelerates at 1.5 m/s^2 to a max speed of 30 m/s and the bike accelerates at 2.5 m/s^2 to a max speed of 20 m/s.

What is the greatest distance that the motorbike is in front of the car?

$53\frac{1}{3} \text{ m}$