Name .....Date.....

UAM calculations

Calculating the average acceleration from the change in speed $a_{av} = \frac{\Delta v}{\Delta t}$

1. A car takes 6 seconds to accelerate from 0 to 30m/s; calculate the acceleration.

2. A car is travelling at 10 m/s accelerates to make an overtaking; in two seconds it reaches the speed of 20 m/s; calculate the acceleration.

3. A car is travelling at 25 m/s; at one moment it starts breaking and stops after 5 seconds. Calculate the acceleration.

4. A ball is thrown upwards with a speed of 9.8 m/s . After 2 seconds it is falling down at the same speed but in the opposite direction. Calculate the acceleration.

Calculating the final speed from acceleration $v = v_o + a\Delta t$

5. A motorbike is travelling at 10 m/s and accelerates with an acceleration of 5 m/s^2 ; calculate the speed after 3 seconds.

6. A ball falls down from rest. Assuming the acceleration of gravity equals to 9.8 m/s^2 calculate its speed in m/s and km/h after 4 tenths of second.

7. A ball is thrown upwards with a speed of 9.8 m/s . Assuming the acceleration of gravity equals to 9.8 m/s^2 calculate its speed after half a second.

8. A car is travelling at 25 m/s; at one moment it starts breaking with a decelaration of 3 m/s^2. Calculate the speed after 4 seconds.

Calculating the displacement from acceleration and elapsed time $\Delta s = vo\Delta t + \frac{1}{2}a\Delta t^2$

9. Calculate the displacement for the car of exercise 1

10. Calculate the displacement for the car of exercise 2

11. Calculate the displacement for the car of exercise 3

12. Calculate the maximum height reached by the ball of exercise 4

Calculating the time from acceleration and displacement $\Delta t = \sqrt{\frac{2\Delta s}{a}}$

13. A ball falls down from rest and an height of 1.5 m. Assuming the acceleration of gravity equals to 9.8 m/s^2 calculate the time it takes to reach the ground.

Combining the law of speed and the low of displacement $\Delta s = vo\Delta t + \frac{1}{2}a\Delta t^2$; $v = v_o + a\Delta t$

14. A car travelling at 30 m/s starts breaking and stops after 150m; calculate the acceleration of the breaking and the time needed (write down staring speed and final speed; calculate the time from the speed equation and substitute it in the displacement equation to find the acceleration; now calculate the time with the first equation)