Motion at constant acceleration

- **Acceleration:**

$$a = \frac{\text{change in velocity}}{\text{change in time}} = \frac{\Delta v}{\Delta t}$$

- **If there were no air resistance, all objects in Earth gravity would fall with the same acceleration, g=9.8 m/s^2**

- **For motion at constant acceleration *a* , with no initial speed, the displacement after time *t* is:**

$$\mathrm{D}x = v_{average} t = \left(\frac{0 + at}{2} \right) \times t = \frac{at^2}{2}$$

Homework

Problem 1.

Suppose that you are trying to reproduce an experiment of Galileo by dropping a rock from certain tower. The time of its free fall turns out to be t=5.0 seconds.
a) How tall is the tower?
b) What will be the time of the rock's fall if it is dropped from half the tower's height?

Problem 2.

The largest passenger airplane, Airbus A380, has the take off speed v= 280 km/hr. It reaches that speed by moving at acceleration a=2 m/s^2, starting from rest. How long the runway should be?
Hint: few classes ago we found the time it takes this plane to accelerate.