

# 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,  $g=9.8 \text{ m/s}^2$

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

$$Dx = v_{\text{average}} t = \left( \frac{0 + at}{2} \right) \times t = \frac{at^2}{2}$$

# Homework

## Problem 1.

A car starts moving with a constant acceleration from rest. During the first 5 seconds the car travels 50 meters.

- a) Find the acceleration of the car.
- b) What is the car's speed after these 5 seconds?

## 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<sup>2</sup>, starting from rest. How long the runway should be?

**Hint:** few classes ago we found the time it takes this plane to accelerate.