# Formulas for motion in 2D

Based on your experiences you are asked to write formulas for the motion in the horizontal and vertical direction for a projectile motion.

## Vertical motion

In this direction gravity is the only force with an effect on the projectile. The projectile has a starting height and velocity in this direction as well.

What was the formula for free fall used to describe this motion?

How can initial height and velocity be added to this formula?

## Horizontal motion

In this direction we assume no forces are affecting the projectile.

What type of motion do we have when there are no forces affecting an object?

Which formula can describe this type of motion?

## Initial velocity

The initial velocity is going to have a vertical and horizontal component. The velocity measured in the experiment is however a combination of the two.

Draw a figure showing the relation between the two components of the initial velocity and the combined.

Write a formula for each of the components showing how to calculate them from the initial velocity.