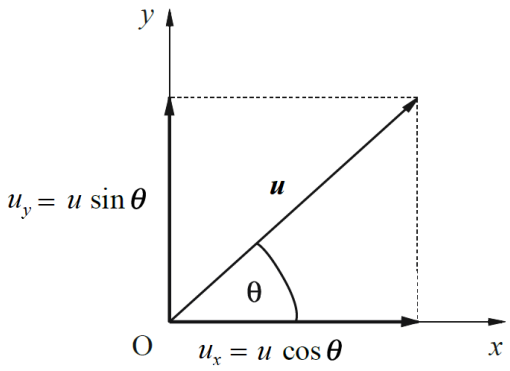
Projectiles Essential information

- Acceleration due to gravity is 9.31 ms^{-2} acting vertically downwards and often approximated to 10 ms^{-2}
- For a given initial velocity $\boldsymbol{u}$ of magnitude u and at an angle θ to the horizontal,

  Initial horizontal velocity is given by: $u_x = u \cos\theta$
  Initial vertical velocity is given by: $u_y = u \sin\theta$

  This is shown in the diagram below:



- For two-dimensional motion, taking gravity as 10 ms^{-2},
  vertical position is given by $y = u_y - 5t^2$
  horizontal position $x = u_x t$
- The vector velocity $\boldsymbol{v}$ has magnitude $v = \sqrt{v_x^2 + v_y^2}$ and at angle to the horizontal given by

$$\tan^{-1}\left(\frac{v_y}{v_x}\right)$$