Year 12 Physics
Quick Quiz: Projectile Motion

1. Calculate the initial components of velocity for an object launched at 30 ms^{-1} at an angle of 30° above the horizontal.

   30 ms^{-1}
   30°

   $V_{0_V} = V_0 \sin\theta = 30 \sin 30° = 15 \, ms^{-1}$

   $V_{0_H} = V_0 \cos\theta = 30 \cos 30° = 26 \, ms^{-1}$

2. State, for each of the following cases, the variable(s) which are zero.
   (a) An object dropped V_{0_V} (and V_H)

   (b) An object that launches and lands at the same height

   S_V for time of flight

   (c) Maximum height

   V_V

   (d) Horizontal component of a projectile

   a_H

3. Calculate the velocity of an object after 1.0 seconds if it was launched horizontally at a speed of 5.0 ms^{-1}.
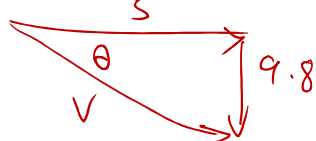
   $V_V = V_{0_V} + a_V t = 0 + (-9.8)(1.0)$

   $= -9.8 \, ms^{-1}$

   $V_H = V_{0_H} = 5$

   $\theta = \tan^{-1}\left(\frac{9.8}{5}\right)$

   5
   θ   9.8
   V

   $V = \sqrt{9.8^2 + 5^2} = 11 \, ms^{-1}$

   $= 63°$ below horizontal

4. State the two concepts that can be shown from a multi-image diagram.

   ① Horizontal velocity is constant

   ② Vertical motion is not affected by horizontal motion