# Year 12 Physics Self-Assessment Topic 1: Projectile Motion

### Formative Test 1

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| ***Expectation***  From SACE Subject Outline  *Note: these can be asked in converse* | ***Test Q*** | ***Proficiency***  (beginning/sometimes/proficient) | ***Comments/questions*** | ***Assignment question(s)*** |
| Given a multi-image photograph of a projectile, demonstrate that the:   * horizontal component of velocity is constant * acceleration is in the vertical direction and is the same as that of a vertically free-falling object. | **5(a)** |  |  | Assignment 2 Q2 |
| Draw a vector diagram in which the horizontal and vertical components of velocity are added, giving the resultant velocity vector at any instant.  Using trigonometric calculations or a scale diagram, calculate, from its horizontal and vertical components, the magnitude and direction of a velocity vector at any instant. | **3(c)** |  |  | Assignment 1 Q1 (c) |
| On a diagram showing the path of a projectile, draw vectors to represent the velocity and acceleration of the projectile at any instant. | **5(c)** |  |  | Assignment 2 Q1 |
| Given the initial velocity of a projectile, calculate the vertical component of velocity at any instant. | **3(a)** |  |  | Assignment 1 Q1 (c) |
| Using trigonometric calculations or a scale diagram, resolve a velocity vector into its horizontal and vertical components. | **4(a)** |  |  | Assignment 1 Q1 (a), Q4  Assignment 2 Q5 |
| Calculate the time of flight of a projectile in cases where the final height is the same as the initial height. | **4(b)** |  |  | Assignment 1 Q1 (a)  Assignment 2 Q5 (a) |
| Using the horizontal component of velocity and the time of flight, calculate the range of a projectile. | **3(b)** |  |  | Assignment 1 Q1 (b)  Assignment 2 Q5 (a) |
| For a projectile launched from ground height, find, by using sample calculations or otherwise, the:   * launch angle that results in the maximum range * relation between the launch angles that result in the same range. | **-** |  |  | Assignment 2 Q3 |
| Using the vertical component of the initial velocity and the acceleration, calculate the maximum height of a projectile. | **2** |  |  | Assignment 1 Q4  Assignment 2 Q5 (b) |
| Using the time of flight and the acceleration, calculate the maximum height of a projectile. | **5(b)** |  |  | Assignment 1 Q5 |
| Describe how air resistance affects both the horizontal component and the vertical component of velocity and hence the time of flight and range of a projectile. | **5(d)** |  |  | Assignment 2 Q4 |
| Compare qualitatively the force of air resistance acting on different objects. | **3(d)** |  |  |  |
| Describe and explain the effect of the launch height of a projectile (e.g. a shot put launched from shoulder height) on the maximum range, and the effect of the launch angle for a given height. | **4(c)** |  |  |  |