Determination of the apex

Apex is the maximum vertical height of a projectile

Strategy for calculation

- At the apex the vertical velocity, V_y, is zero.
- Use $V_{yf}^2 = V_{yi}^2 + 2 \times a \times D$.

- At the apex $V_{yf} = 0$, so $V_{yf}^2 = 0$
- $\qquad 0 = V_{yi}^2 + (2 \times (-9.8) \times D)$
- $\quad - V_{yi}^2 = -19.6 \times D_y$
- $\qquad V_y^2/19.6 = D_y = apex$

Example

- Jack Hurley throws a pass to Joey Troina at 20 m/s at 40 degrees above the ground. Calculate the apex of the motion.

- 1. $V_x = V\cos(angle) = 20 \times .766 = 15.3$ m/s

-        $V_y = V\sin(angle) = 20 \times .64 = 12.86$ m/s

- 2. apex $= D_y = V_y^2/19.6 = 8.44$ m

Group Activity

- Using apex = Dy = Vy^2/19.6 calculate the apex of the following projectiles:
- 1.   V = 75 m/s at 20 degrees
- 2.   V = 75 m/s at 40 degrees
- 3.   V = 75 m/s at 60 degrees
- 4.   V = 75 m/s at 80 degrees
- 5.   V = 75 m/s at 90 degrees