

# Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

## 7 Projectiles

### Exercise A, Question 2

#### Question:

David kicks a ball, from ground level, with a speed of  $15 \text{ m s}^{-1}$  at an angle of  $30^\circ$  to the horizontal. How far away from him does the ball land?

#### Solution:

$$\left. \begin{aligned} x &= 15 \cos 30^\circ t \\ y &= 15 \sin 30^\circ t - \frac{1}{2}gt^2 \end{aligned} \right\} \begin{array}{l} \text{equations of} \\ \text{motion of} \\ \text{projectile} \end{array}$$

Ball lands when  $y = 0 \Rightarrow$

$$15 \sin 30^\circ t - \frac{1}{2}gt^2 = 0$$

$$t = \frac{15 \sin 30^\circ}{\frac{1}{2}g} \text{ or } 0 \text{ (not required)}$$

$$= 1.5306 \text{ s}$$

$$\begin{aligned} \therefore \text{Distance, } x, & \text{ is } 15 \cos 30^\circ \times 1.5306 \\ & = 19.9 \text{ m.} \end{aligned}$$