# Marked example 3

Paper 2 style · Graphic display calculator

## 3 7 marks SL 1.3 · 1.8 ●●● Demanding

A ball is dropped from a height of 2 m. After each bounce, it rises to 80 % of the height from which it last fell.

**(a)** Find the height the ball reaches after the third bounce. **[2]**

**(b)** Find the total vertical distance travelled by the ball before it comes to rest. **[3]**

**(c)** Find the number of bounces after which the ball first rises to less than 0.1 m. **[2]**

**MARKSCHEME (a)**

$2 \times 0.8^3$ **(M1)**

$= 1.024 \text{ m} \quad (1.02)$ **A1**

**Total 2 marks**

**MARKSCHEME (b)**

up and down after the first fall: $2 \times \dfrac{1.6}{1 - 0.8}$ **M1**

$= 16$ **(A1)**

$2 + 16 = 18 \text{ m}$ **A1**

**Total 3 marks**

**Note** The heights after the bounces, $1.6,\ 1.28,\ \ldots$, are each travelled twice.

**MARKSCHEME (c)**

$2 \times 0.8^n < 0.1$ **(M1)**

$n = 14$ **A1**

**Total 2 marks**

**Note** $n > 13.4$.



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