

Bonfire Night maths activities for IGCSE and GCSE

IGCSE Math Revision · IGCSE and GCSE (Higher and Extended) · 5 November · Student sheet

Name _____

Class _____

Date _____

The starter is non-calculator. A calculator helps with the cone task.

Starter (5 minutes)

1. Write down the next two terms: 5, 11, 17, 23, ...
2. Find the n th term of 5, 11, 17, 23, ...
3. Solve $x^2 - 9x + 20 = 0$.
4. $h = 30t - 5t^2$. Find h when $t = 2$.

Main activity (35 minutes)

Task A: The rocket

The height of a firework rocket, h metres, t seconds after launch is modelled by $h = 40t - 5t^2$.

- a. Find the height after 3 seconds.
- b. If the rocket did not explode, after how many seconds would it land?
- c. Complete the square to find the greatest height and when it happens.
- d. For how long is the rocket more than 60 m above the ground?

Task B: Remember, remember: sparkler patterns

Pattern 1 uses 5 sparklers, pattern 2 uses 9 and pattern 3 uses 13.

- Find the n th term for the number of sparklers.
- How many sparklers are in pattern 50?
- Can a pattern use exactly 100 sparklers? Explain.
- In a firework display, the numbers of stars in each burst are 3, 8, 15, 24, 35, ... Find the next term and the n th term.
- Which burst has 168 stars?

Task C: The bonfire

A bonfire is built as a cone with base radius 1.5 m and height 2 m. Volume of a cone = $\frac{1}{3}\pi r^2 h$; curved surface area = $\pi r l$.

- Find the volume of the bonfire, to 3 significant figures.
- Find the slant height and the curved surface area, to 3 significant figures.

Extension

- A second rocket is launched 1 second after the first. Its height is $h = 50(t - 1) - 5(t - 1)^2$, where t is the time since the first launch. When are the two rockets at the same height, and how high are they? Give the height to 3 significant figures.