Christmas maths escape room for CBSE Class 10: Class 11

CBSE Math Revision · A Level Maths (Year 12 and Year 13) · Student sheet

Name _____ Class _____ Date _____

No calculator needed.

Starter (5 minutes)

1. Evaluate $27^{1/3}$.

2. Differentiate x^4.

3. Evaluate $\log_2 8$.

Main activity (36 minutes)

Cut out the cards. Each code unlocks the next card.

Lock 1: The wrapping room

The first lock shows an index equation.

a. Solve $2^{x-1} = 64$. This is code 1.

Code for lock 1: _____

Lock 2: The list

The second lock shows a binomial expansion.

a. Find the coefficient of x^2 in $(1 + 2x)^n$, where n = code 1. This is code 2.

Code for lock 2: _____

Lock 3: The chimney

The third lock shows an integral.

a. Find the positive value of a for which $\int_0^a 3x^2 \, dx$ = code 2 − 20. This is code 3.

Code for lock 3: _____

Lock 4: The tinsel

Each strand of tinsel is half as long as the one before.

a. A geometric series has first term code 3 and common ratio 1/2. Find its sum to infinity. This is code 4.

Code for lock 4: _____

Lock 5: The factor lock

The lock shows $f(x) = x^3 - 2x + 5$.

a. Find the remainder when $f(x)$ is divided by $(x - c)$, where c = code 4 ÷ 4. This is code 5.

Code for lock 5: _____

Lock 6: The workshop door

The last lock.

a. Find the sum of the first n terms of $2 + 5 + 8 + \ldots$, where n = code 5. It opens the door.

Code for lock 6: _____

Extension

1. A toy rocket's height is $h = 20t - 5t^2$ metres after t seconds. Find its greatest height.