Christmas maths escape room for IB Maths: Beyond school

IB Math Revision · Beyond school: for adults and maths fans · Student sheet

Name _____ Class _____ Date _____

No calculator needed: every code is a whole number.

Starter (5 minutes)

1. What is 2^{10}?

2. How many prime numbers are there below 30?

3. What is 11^2?

Main activity (36 minutes)

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

Lock 1: The stocking count

Stockings hang in a rectangle.

a. How many positive divisors does 360 have? This is code 1.

Code for lock 1: _____

Lock 2: The elf handshakes

The elves greet each other.

a. Code 1 elves each shake hands once with every other elf. How many handshakes are there? This is code 2.

Code for lock 2: _____

Lock 3: The base-5 lock

The lock only reads base 5.

a. Write code 2 in base 5 and add up its digits. This is code 3.

Code for lock 3: _____

Lock 4: The snowflake

A snowflake curve starts as an equilateral triangle with perimeter 3. Each step replaces every edge with 4 edges a third as long.

a. After code 3 steps the perimeter is p/q in lowest terms. Code 4 is $p - q$.

Code for lock 4: _____

Lock 5: The remainder

One more step.

a. Find the remainder when code 4 is divided by 24. This is code 5.

Code for lock 5: _____

Lock 6: The workshop door

The last lock.

a. The door opens with the number of ways to write code 5 as an ordered sum of 1s and 2s.

Code for lock 6: _____

Extension

1. Find the smallest whole number bigger than 1 that leaves remainder 1 when divided by each of 2, 3, 4, 5 and 6.