Christmas maths escape room for IB Maths: HL: answers

IB Math Revision · IB HL and A Level Further Maths (no calculator) · Teacher answers and notes

No calculator needed: every code is a whole number.

Teacher notes

- For IB HL and A Level Further Maths classes. Every answer is exact and the whole set works without a calculator.
- How to run it: print the student sheet and cut out the six lock cards. Give each team lock 1. When a team brings you the right code, give them the next card (the answer key is in the answers PDF). The first team to open lock 6 escapes.
- Each code is used in the next lock, so check every code before the team moves on: one slip early on breaks the chain.

Starter

1. **5**
   - $\sqrt{(16 + 9)} = 5$
2. **15**
   - $6 \times 5 \div 2 = 15$
3. **12**
   - $\mathrm{d}y/\mathrm{d}x = 3x^2 = 12$

Lock 1: The sorting machine

a. **120**

- $15 \times 16 \div 2 = 120$

Lock 2: The complex cracker

a. **13**

- $a = 12$, so $|z| = \sqrt{(144 + 25)} = 13$

Lock 3: The endless tinsel

a. **52**

- Sum to infinity $= 13 \div (1 - 3/4) = 13 \times 4 = 52$

Lock 4: The elf integral

a. **49**

- $k = \sqrt{49} = 7$
- $[x^2]$ from 0 to 7 = 49

Lock 5: The sack of crackers

a. **6**

- $\mathrm{Var}(X) = np(1 - p) = 49 \times 1/7 \times 6/7 = 6$

Lock 6: The workshop door

a. **15**

- ${}^6C_2 = 15$

Extension

1. **255 = 11111111 in binary**
   - $120 + 13 + 52 + 49 + 6 + 15 = 255$
   - $255 = 2^8 - 1 = 11111111$ in binary: eight 1s.

Every question is original and every answer was checked before publishing.