

e Day maths activities for IGCSE and GCSE: answers

IGCSE Math Revision · IGCSE and GCSE (Higher and Extended) · 7 February · Teacher answers and notes

The starter is non-calculator. A calculator is needed for the main activity.

Teacher notes

- e Day is 7 February because 2/7, written month first, matches $e = 2.7...$
- Task B shows where e comes from without any algebra: let groups race to compute it with bigger and bigger n .
- Common slip: using 1.3 instead of 1.03 as the multiplier for 3%.

Starter

1. **£35**
 - $350 \div 10 = 35$
2. **£242**
 - $200 \times 1.1 = 220$, then $220 \times 1.1 = 242$
3. **1.04 and 0.85**
 - $100\% + 4\% = 104\% = 1.04$
 - $100\% - 15\% = 85\% = 0.85$
4. **1024**
 - $2^5 = 32$ and $32 \times 32 = 1024$

Task A: Compound interest

- a. **£5150.00**
 - $5000 \times 1.03 = 5150$
- b. **£5970.26**
 - $5000 \times 1.03^6 = 5970.261...$
- c. **£970.26**
 - $5970.26 - 5000 = 970.26$
- d. **£70.26**
 - Simple interest: $5000 \times 0.03 \times 6 = 900$.
 - $970.26 - 900 = 70.26$

Task B: Compound more often?

- a. **£1120.00**
 - $1000 \times 1.12 = 1120$
- b. **£1126.83**
 - $1000 \times 1.01^{12} = 1126.825...$
- c. **£1127.47**
 - $1000 \times (1 + 0.12/365)^{365} = 1127.474...$

d. **£1127.50**

- $1000 \times e^{0.12} = 1127.496\dots$
- Adding interest every day gets within 3p of this limit.

Task C: Depreciation and doubling

a. **£11 054.25**

- $18\,000 \times 0.85^3 = 11\,054.25$

b. **8 years**

- $18\,000 \times 0.85^7 = 5770.7\dots$, which is still more than £5000.
- $18\,000 \times 0.85^8 = 4905.1\dots$, which is less than £5000.

c. **12 years; $72 \div 6 = 12$**

- $1.06^{11} = 1.898\dots$, $1.06^{12} = 2.012\dots$
- So 12 years. The 'rule of 72' gives $72 \div 6 = 12$ too.

Extension

1. **£500**

- $520 \div 1.04 = 500$

2. **2, 2.5937, 2.7048: getting close to $e = 2.71828\dots$**

- $(1 + 1)^1 = 2$
- $1.1^{10} = 2.59374\dots$
- $1.01^{100} = 2.70481\dots$

Every question is original and every answer was recomputed by computer before publishing.