



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Growth & Decay · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☒ Secure

☐ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Growth & Decay

Total marks available: 134

● Growth & Decay

✓ 66,703

Q1 · ● Developing · 4 marks

METHOD

Multiplier = 1.03

$$60430 \times 1.03^4 = 66,703$$

✓ 10,696

Q2 · ● Developing · 4 marks

METHOD

Multiplier = 1.08

$$8610 \times 1.08^3 = 10,696$$

✓ £34,110.00

Q3 · ● Developing · 4 marks

METHOD

Multiplier = 0.91

$$\text{Original} = £27,936.94 \div 0.91^2 = £34,110.00$$

✓ £460.00

Q4 · ● Developing · 4 marks

METHOD

Multiplier = 0.93

$$\text{Original} = £393.59 \div 0.93^2 = £460.00$$

✓ 17,293

Q5 · ● Developing · 4 marks

METHOD

Multiplier = 1.04

$$15070 \times 1.04^4 = 17,293$$

✓16,764

Q6 · ● Developing · 4 marks

METHOD

Multiplier = 1.05

$$14690 \times 1.05^3 = 16,764$$

✓11,038

Q7 · ● Developing · 4 marks

METHOD

Multiplier = 1.06

$$9400 \times 1.06^3 = 11,038$$

✓4,198

Q8 · ● Developing · 4 marks

METHOD

Multiplier = 1.05

$$3520 \times 1.05^4 = 4,198$$

✓£2,660.01

Q9 · ● Developing · 4 marks

METHOD

Multiplier = 0.93

$$\text{Original} = £2,105.27 \div 0.93^3 = £2,660.01$$

✓£14,340.00

Q10 · ● Developing · 4 marks

METHOD

Multiplier = 0.89

$$\text{Original} = £9,939.83 \div 0.89^3 = £14,340.00$$

✓£1,237.38

Q11 · ● Secure · 5 marks

METHOD

After stage 1: $1940 \times 0.91^3 = £1,461.93$

After stage 2: $1461.93 \times 0.92^2 = £1,237.38$

✓1,001

Q12 · ● Secure · 5 marks

METHOD

After stage 1: $1190 \times 0.92^3 = 927$

After stage 2: $927 \times 1.08^1 = 1,001$

✓5%

Q13 · ● Secure · 5 marks

METHOD

Overall multiplier = $2613.34 \div 2150 = 1.215507$

Annual multiplier = $\sqrt[4]{1.215507} = 1.050000$

Rate = $(1.050000 - 1) \times 100 = 5\%$

✓1,728

Q14 · ● Secure · 5 marks

METHOD

After stage 1: $2120 \times 1.04^2 = 2,293$

After stage 2: $2293 \times 0.91^3 = 1,728$

✓£12,010.24

Q15 · ● Secure · 5 marks

METHOD

After stage 1: $14460 \times 0.94^1 = £13,592.40$

After stage 2: $13592.4 \times 0.94^2 = £12,010.24$

✓ 9%

Q16 · ● Secure · 5 marks

METHOD

$$\text{Overall multiplier} = 10724.21 \div 6970 = 1.538624$$

$$\text{Annual multiplier} = \sqrt[5]{1.538624} = 1.090000$$

$$\text{Rate} = (1.090000 - 1) \times 100 = 9\%$$

✓ £1,204.43

Q17 · ● Secure · 5 marks

METHOD

$$\text{After stage 1: } 1220 \times 0.92^2 = £1,032.61$$

$$\text{After stage 2: } 1032.61 \times 1.08^2 = £1,204.43$$

✓ 446 g

Q18 · ● Secure · 5 marks

METHOD

$$\text{After stage 1: } 390 \times 1.06^3 = 464 \text{ g}$$

$$\text{After stage 2: } 464 \times 0.96^1 = 446 \text{ g}$$

✓ 5%

Q19 · ● Secure · 5 marks

METHOD

$$\text{Overall multiplier} = 2292 \div 1980 = 1.157576$$

$$\text{Annual multiplier} = \sqrt[3]{1.157576} = 1.049985$$

$$\text{Rate} = (1.049985 - 1) \times 100 = 5\%$$

✓ 675 g

Q20 · ● Secure · 5 marks

METHOD

$$\text{After stage 1: } 740 \times 0.97^2 = 696 \text{ g}$$

$$\text{After stage 2: } 696 \times 0.97^1 = 675 \text{ g}$$

✓ 6.01%

Q21 · ● Greater Depth · 5 marks

METHOD

Overall multiplier = $554 \div 710 = 0.780282$

Annual multiplier = $\sqrt[4]{0.780282} = 0.939859$

Rate = $(1 - 0.939859) \times 100 = 6.01\%$

✓ 12%

Q22 · ● Greater Depth · 5 marks

METHOD

Overall multiplier = $2411 \div 4020 = 0.599751$

Annual multiplier = $\sqrt[4]{0.599751} = 0.880021$

Rate = $(1 - 0.880021) \times 100 = 12\%$

✓ 5 years

Q23 · ● Greater Depth · 4 marks

METHOD

Multiplier = 1.08

Applying the multiplier repeatedly: after 4 years the value is still at or below £3,660, but after 5 years it first exceeds it.

Answer: 5 years

✓ 5 years

Q24 · ● Greater Depth · 4 marks

METHOD

Multiplier = 1.08

Applying the multiplier repeatedly: after 4 years the value is still at or below £6,041, but after 5 years it first exceeds it.

Answer: 5 years

✓ 6 years

Q25 · ● Greater Depth · 4 marks

METHOD

Multiplier = 1.06

Applying the multiplier repeatedly: after 5 years the value is still at or below 38,742, but after 6 years it first exceeds it.

Answer: 6 years

✓ 3 years

Q26 · ● Greater Depth · 4 marks

METHOD

Multiplier = 1.12

Applying the multiplier repeatedly: after 2 years the value is still at or below 73,985, but after 3 years it first exceeds it.

Answer: 3 years

✓ 10%

Q27 · ● Greater Depth · 5 marks

METHOD

Overall multiplier = $1450.71 \div 1990 = 0.729000$

Annual multiplier = $\sqrt[3]{0.729000} = 0.900000$

Rate = $(1 - 0.900000) \times 100 = 10\%$

✓ 4 years

Q28 · ● Greater Depth · 4 marks

METHOD

Multiplier = 1.12

Applying the multiplier repeatedly: after 3 years the value is still at or below 815, but after 4 years it first exceeds it.

Answer: 4 years

✓11.99%

Q29 · ● Greater Depth · 5 marks

METHOD

$$\text{Overall multiplier} = 334 \div 490 = 0.681633$$

$$\text{Annual multiplier} = \sqrt[3]{0.681633} = 0.880069$$

$$\text{Rate} = (1 - 0.880069) \times 100 = 11.99\%$$

✓3 years

Q30 · ● Greater Depth · 4 marks

METHOD

$$\text{Multiplier} = 1.12$$

Applying the multiplier repeatedly; after 2 years the value is still at or below 2,534, but after 3 years it first exceeds it.

Answer: 3 years