# 4.1 Compound Interest and Depreciation: 30-minute Pack

Total Marks

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

**1** A savings account pays 5% compound interest per year. Work out the value of £150 after 2 years.

**(Total for Question 1 is 2 marks)**

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**2** A smartphone cost £240 new. Its value falls by 20% each year. Work out its value after 3 years. Give your answer to 2 decimal places.

**(Total for Question 2 is 2 marks)**

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**3** A jacket now costs £198 after a 10% increase in price. Work out the original price of the jacket before the increase.

**(Total for Question 3 is 2 marks)**

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**4** A tablet is now priced at £96 after losing 20% of its value each year for 2 years. Work out the original price of the tablet.

**(Total for Question 4 is 2 marks)**


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**5** A new car is worth £15000. Its value falls by 15% each year.
Work out its value after 3 years.

**(Total for Question 5 is 3 marks)**

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**6** A delivery van depreciates in value by 12% each year. After 2 years its value is £788. Find its original value before depreciation. Give your answer to the nearest penny.

**(Total for Question 6 is 3 marks)**

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**7** Omar invests £1200 at a rate of 3.5% per year compound interest for 4 years. Calculate the total interest earned, giving your answer to the nearest penny.

**(Total for Question 7 is 3 marks)**


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**8** Show that if an amount P is invested at an annual compound rate r (as a decimal) for n years, the value after n years is $P(1 + r)^n$. You must give a clear algebraic argument.

**(Total for Question 8 is 4 marks)**

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**9** Fatima invests £2000 for 4 years at a rate of 3% per year compound interest. James invests £2000 for 4 years in an account that pays simple interest of £70 per year. After 4 years, who has more money, and by how much? You must show your working.

**(Total for Question 9 is 4 marks)**


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# Mark scheme · 4.1 Compound Interest and Depreciation: 30-minute Pack

## Question 1

| | |
|---|---|
| method: 150 x $(1.05)^2$ or 150 x 1.05 x 1.05 | **M1** |
| £165.38 cao (to 2 dp) or £165.375 oe | **A1** |

**Answer:£165.38 (to 2 dp)**

**Working check: 150 x $(1.05)^2$ = 150 x 1.1025 = 165.375 -> £165.38 (rounded to 2 dp).**

## Question 2

| | |
|---|---|
| method: 240 x $(0.8)^3$ or 240 x 0.8 x 0.8 x 0.8 | **M1** |
| £122.88 cao (to 2 dp) | **A1** |

**Answer:£122.88**

**Working check: 240 x $0.8^3$ = 240 x 0.512 = 122.88.**

## Question 3

| | |
|---|---|
| method: divide by 1.10 | **M1** |
| £180 cao | **A1** |

**Answer:£180**

**Working check: Original = 198 / 1.10 = 180. Check: 180 x 1.10 = 198.**

## Question 4

| | |
|---|---|
| method: divide by $0.8^2$ or 0.64 | **M1** |
| £150 cao | **A1** |

**Answer:£150**

**Working check: original = 96 / 0.64 = 150.**

## Question 5

| | |
|---|---|
| multiplier 0.85 | **M1** |
| 15000 x $0.85^3$ | **M1** |
| £9211.88 | **A1** |

**Answer: £9211.88**

## Question 6

| | |
|---|---|
| Set up: original * $0.88^2$ = 788 or equivalent | **M1** |
| Divide: original = 788 / $0.88^2$ | **M1** |
| £1017.56 cao | **A1** |

**Answer: 1017.56**

## Question 7

| | |
|---|---|
| 1200 x $1.035^4$ oe, or a correct year-by-year method, to find the total value | **M1** |
| 1377.03 (pounds) awrt, the total value after 4 years | **A1** |
| 177.03 (pounds) awrt for the interest earned, ft their total value minus 1200 | **A1** |

**Answer: £177.03**

## Question 8

| | |
|---|---|
| Start: after 1 year amount = P(1 + r); after 2 years amount = P(1 + r)(1 + r) stated | **dM1** |
| Recognise repeated multiplication n times gives $P(1 + r)^n$ | **dM1** |
| Conclude $P(1 + r)^n$ cao | **A1** |
| Clear communicative algebraic justification linking the repeated multiplication to exponent notation | **C1** |

**Answer: $P(1 + r)^n$, with algebraic justification as above.**

## Question 9

| | |
|---|---|
| 2000 x $1.03^4$ oe, or a correct year-by-year method, to find Fatima's total | **M1** |
| 2251.02 (pounds) awrt for Fatima's total | **A1** |
| 2280 (pounds) for James's total (2000 + 4 x 70) | **B1** |
| ft correct conclusion: James has more money, by 28.98 (pounds) awrt | **A1** |

**Answer: James has more money, by £28.98.**


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