4.1 Compound Interest and Depreciation: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The value of an antique is £2000. In the first year its value increases by 3%. In the second year its value increases by 5%.
Work out its value after the two years.

(Total for Question 1 is 3 marks)

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2 Jamie invests £800 at 6% compound interest per year.

(a) Work out the value after 3 years. **(3)**

(b) Work out the interest earned after 3 years, to the nearest pound. **(2)**

(Total for Question 2 is 5 marks)

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3 A used car is priced at £6000. It depreciates by 12% each year for 2 years. After that it is sold and the sale price is reduced by a further 5% as a one-off discount. Work out the final sale price to the nearest pound.

(Total for Question 3 is 3 marks)

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4 Work out the value of £1200 after 2 years when it is invested at 3% compound interest, compounded annually.

(Total for Question 4 is 2 marks)

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5 £5000 is invested for 2 years at a rate of 2.4% per year compound interest. Work out the value of the investment at the end of 2 years, giving your answer to the nearest penny.

(Total for Question 5 is 2 marks)

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6 Leah invests £400 in a savings account that pays compound interest at a rate of 5% per year. Work out the value of her investment at the end of 2 years.

(Total for Question 6 is 2 marks)

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7 A car is valued at £9000. It depreciates in value by 10% each year. Work out the value of the car after 2 years.

(Total for Question 7 is 2 marks)

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8 £250 is invested for 3 years at a rate of 2% per year compound interest. Work out the value of the investment at the end of 3 years, giving your answer to the nearest penny.

(Total for Question 8 is 2 marks)

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9 A boat is bought for £15000. It depreciates in value by 8% per year. Work out its value after 2 years, giving your answer to the nearest pound.

(Total for Question 9 is 2 marks)

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10 £180 is invested for 2 years at a rate of 12.5% per year compound interest. Work out the value of the investment at the end of 2 years, giving your answer to the nearest penny.

(Total for Question 10 is 2 marks)

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11 A tractor is bought for £45000. It depreciates in value by 18% per year. Work out its value after 2 years, giving your answer to the nearest pound.

(Total for Question 11 is 2 marks)

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12 Kwame invests £3500 for 2 years in an account paying 1.6% per year compound interest. Work out the value of his investment at the end of 2 years, giving your answer to the nearest penny.

(Total for Question 12 is 2 marks)

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13 Zoe invests £800 at 4% compound interest, compounded annually, for 3 years. She then withdraws £200 from the account and the remaining amount earns 5% compound interest for one more year. Work out the amount in the account after these transactions. Give your answer to 2 decimal places.

(Total for Question 13 is 4 marks)

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14 A laptop costs £900 when new. It depreciates in value by 25% in the first year, and then by 10% per year for each of the next 2 years. Work out its value after 3 years.

(Total for Question 14 is 3 marks)

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15 A piece of jewellery is bought for £2400. It depreciates in value by 6% per year. Work out its value after 3 years, giving your answer to the nearest penny.

(Total for Question 15 is 2 marks)

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16 A population of bacteria increases by 8% every hour. At 09:00 there are 250 bacteria. Work out the number of bacteria at 12:00 (3 hours later), giving your answer to the nearest whole number.

(Total for Question 16 is 3 marks)

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17 A courier company buys a delivery van for £18000. The van depreciates in value by 20% in its first year, and then by 12% per year for each year after that. The company will replace the van once its value falls below £9000. After how many years will the van need to be replaced? You must show your working.

(Total for Question 17 is 4 marks)

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Mark scheme · 4.1 Compound Interest and Depreciation: 1-hour Pack

Question 1

multiplier 1.03	**M1**
2000 x 1.03 x 1.05	**M1**
£2163.00	**A1**

Answer: £2163.00

Question 2

(a) method: 800 x $(1.06)^3$	**M1**
(a) calculate $(1.06)^3$ or multiply 800 x 1.06 x 1.06 x 1.06	**M1**
(a) £952.81 cao (to 2 dp)	**A1**

(a) Answer: £952.81

(b) method: interest = value after 3 years - original amount	**M1**
(b) £153 cao (nearest pound)	**A1**

(b) Answer:£153 (nearest pound)

Working check: interest = 952.8128 - 800 = 152.8128 -> £153 (nearest pound).

Question 3

method: 6000 x $(0.88)^2$ then x 0.95	**M1**
correct intermediate calculation 6000 x 0.88^2 = 6000 x 0.7744 = 4646.4	**M1**
£4413 cao (to nearest pound 4646.4 x 0.95 = 4413.08 -> 4413)	**A1**

Answer:£4413 (nearest pound)

Working check: after 2 years = 6000 x 0.88^2 = 4646.40; after 5% discount = 4646.40 x 0.95 = 4413.08 -> £4413.

Question 4

Use of compound growth: 1200 * $(1 + 0.03)^2$ or 1200 * 1.03^2	**M1**
£1273.08 cao	**A1**

Answer: 1273.08 (to 2 decimal places).

Question 5

5000 x 1.024^2 oe, or a correct year-by-year method	**M1**
5242.88 (pounds) cao	**A1**

Answer: £5242.88

Question 6

400 x 1.05^2 oe, or a correct year-by-year method	**M1**
441 (pounds) cao	**A1**

Answer: £441

Question 7

9000 x 0.9^2 oe, or a correct year-by-year method	**M1**
7290 (pounds) cao	**A1**

Answer: £7290

Question 8

250 x 1.02^3 oe, or a correct year-by-year method	**M1**
265.30 (pounds) awrt	**A1**

Answer: £265.30

Question 9

15000 x 0.92^2 oe, or a correct year-by-year method	**M1**
12696 (pounds) cao	**A1**

Answer: £12696

Question 10

180 x 1.125^2 oe, or a correct year-by-year method	**M1**
227.81 (pounds) awrt	**A1**

Answer: £227.81

Question 11

45000 x 0.82^2 oe, or a correct year-by-year method	**M1**
30258 (pounds) cao	**A1**

Answer: £30258

Question 12

3500 x 1.016^2 oe, or a correct year-by-year method	**M1**
3612.90 (pounds) awrt	**A1**

Answer: £3612.90

Question 13

Amount after 3 years at 4%: 800 * 1.04^3 or equivalent method	**M1**
Subtract 200 then apply 5%: (800*1.04^3 - 200) * 1.05	**M1**
£734.89 awrt (intermediate correct values seen)	**A1**
£734.89 cao to 2 dp	**A1**

Answer: 734.89

Question 14

900 x 0.75 (= 675) for the value after year 1	**M1**
correct method applying 0.9 for each of the following 2 years	**M1**
546.75 (pounds) cao	**A1**

Answer: £546.75

Question 15

2400 x 0.94^3 oe, or a correct year-by-year method	**M1**
1993.40 (pounds) awrt	**A1**

Answer: £1993.40

Question 16

250 x 1.08^3 oe, or a correct repeated multiplication method	**M1**
314.928 awrt (accept awrt 314.9)	**A1**
315 cao, correctly rounded to the nearest whole number	**A1**

Answer: 315 bacteria

Question 17

18000 x 0.8 (= 14400) for the value after year 1	**M1**
correct method repeatedly applying 0.88 for the following years	**M1**
value after year 4 = 9813.20 awrt, correctly shown to still be above 9000	**A1**
correct final answer: 5 years, with value after year 5 = 8635.61 awrt shown to be below 9000	**A1**

Answer: 5 years

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