FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

R16: Growth and decay

Compound interest, depreciation, growth and decay and iterative processes

20 marks · 25 minutes · Calculator allowed

1) £3000 is invested at 4% compound interest per year. Find its value after 3 years.

£ .....

[Question 1: 2 marks]

2) A car is worth £18 000. Its value falls by 15% each year. Find its value after 4 years.

£ .....

[Question 2: 2 marks]

3) Write down the multiplier for

(a) an increase of 3.5%

.....

(1)

(b) a decrease of 8%

.....

(1)

[Question 3: 2 marks]

4) A town has 12 000 people. The population grows by 2% each year. Estimate the population after 10 years.

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[Question 4: 2 marks]

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5) £5000 is invested at 2.5% compound interest per year for 6 years. How much interest is earned?

£ .....

[Question 5: 2 marks]

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6) £1000 is invested at 6% compound interest per year. After how many whole years will it first be worth more than £1500?

..... years

[Question 6: 2 marks]

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7) A colony of bacteria doubles every hour. There are 50 bacteria at the start. How many are there after 8 hours?

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[Question 7: 1 marks]

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8) A radioactive substance halves in mass every 5 days. Its mass is 80 g. Find its mass after 20 days.

..... g

[Question 8: 2 marks]

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9) A fish population changes according to $P_{n+1} = 1.1P_n - 50$, where P_n is the population after n years. $P_0 = 1000$. Find P_1, P_2 and P_3.

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[Question 9: 3 marks]

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10) £2000 is invested for 5 years at 3% per year. How much more interest is earned with compound interest than with simple interest?

£ .....

[Question 10: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	£3374.59	3000×1.04^3 (M1); A1.
2	£9396.11	$18\,000 \times 0.85^4$ (M1); A1.
3	(a) 1.035 (b) 0.92	B1 each.
4	14 628	$12\,000 \times 1.02^{10}$ (M1); A1.
5	£798.47	$5000 \times 1.025^6 = 5798.47$ (M1); A1.
6	7	$1.06^6 = 1.419$, $1.06^7 = 1.504$ (M1); A1.
7	12 800	B1.
8	5	4 halvings (M1); A1.
9	1050, 1105, 1165.5	B1 each.
10	£18.55	Simple £300 and compound £318.55 (M1); A1.