FOUNDATION & HIGHER

HIGHER EXTENDS

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

R16: Growth and decay

Solve problems involving compound growth, decay and iteration

20 marks · 25 minutes · Calculator allowed

1) £5000 is invested at 3.5% compound interest per year. After how many whole years will it first be worth more than £6000?

..... years

[Question 1: 3 marks]

2) A car worth £20 000 loses 15% of its value in the first year and 10% in each year after that. Find its value after 3 years.

£ .....

[Question 2: 3 marks]

3) Bacteria double every 20 minutes. There are 300 at the start. How many are there after 2 hours?

.....

[Question 3: 2 marks]

4) £2000 is invested for 5 years. Account A pays 4% compound interest. Account B pays 4.5% simple interest. Which gives more, and by how much?

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[Question 4: 4 marks]

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5) A radioactive sample decays from 800 g to 50 g in 12 days. Find its half-life.

..... days

[Question 5: 3 marks]

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6) A town of 8000 people shrinks by 6% each year. After how many whole years is it first below 6000?

..... years

[Question 6: 3 marks]

7) $P_{n+1} = 1.1P_n - 500$ and $P_0 = 6000$. Find P_3.

.....

[Question 7: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	6	$1.035^5 = 1.188$ (P1); $1.035^6 = 1.229$ (P1); A1.
2	£13 770	$20\,000 \times 0.85$ (P1); $\times 0.9^2$ (P1); A1.
3	19 200	6 doublings (P1); A1.
4	B by £16.69	A: £2433.31 (P1, P1); B: £2450 (P1); A1.
5	3	4 halvings (P1, P1); $12 \div 4$ (A1).
6	5	$0.94^4 = 0.781$ (P1); $0.94^5 = 0.734$ (P1); A1.
7	6331	6100, 6210 (P1); A1.