

## Foundation Check In - 5.03 Discrete growth and decay

1. Aliya invests £3000 at 1.5% compound interest per year. How much money does she have at the end of 2 years?
2. A pram bought for £500 depreciates by 5% each year. How much is the pram worth after one year?
3. David invests £2500 at 2.4% per year interest. How much money will he have if he closes the account after 6 months?
4. Jane takes out a bank loan of £7000 over 3 years at 5.9% compound interest per year. Assuming she does not pay back any of the loan, how much interest does she pay over the 3 years?
5. A new car bought for £10 000 depreciates by 40% in its first year, then a further 20% in its second year and 15% in its third year. How much is the car worth after 3 years?
6. Explain why a 10% increase followed by a further 10% increase is not the same as a single increase of 20%.
7. Sam earns £15 000 per year. He is given a pay rise of 2% per year for the next 4 years. He says, "In 4 years' time I will earn £16 200". Explain why he is wrong.
8. Wilson holds some shares in a company which he bought for £2500. The value of the shares increased by 4% in the first year and then fell by 4% in the next year. Explain why the shares are not worth £2500 after the 2 years.
9. Karen borrows £6000 from her parents to buy a car when she starts her first job. The loan is given on a simple interest basis at a rate of 2% per year. Karen decides to save up and pay the full amount plus any interest owing to her parents in one payment. Karen pays back £6630. How long did Karen borrow the money for?
10. Leo bought a house for £650 000. If it increases in value by 3% each year, how many years will it take to reach a value of £1 million?

### Extension

Juan has £6000 to invest for 5 years. He has the choice of 2 offers.

#### Offer A

4.6% interest per year for the first year followed by 4 years at 1.3% per year.
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#### Offer B

5 years at 2% per year.
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Which offer would give Juan the most money at the end of 5 years and by how much?



# GCSE (9-1) MATHEMATICS

## Answers

1. £3090.68
2. £475
3. £2530
4. £1313.54
5. £4080
6.  $A \times 1.1 \times 1.1 = A \times 1.21$ , which is equivalent to a 21% increase.  
Or £100 increased by 10% is £110, £110 increased by 10% is £121, whereas £100 increased by 20% is £120, therefore it is not the same.
7. Sam has used simple interest not compound interest. He should earn £16 236.48 in 4 years' time because interest is paid on previous interest.
8. In the first year the value of the shares increase to £2600 but in the second year the value of the shares decrease to £2496.
9. 5.25 years or 5 years and 3 months
10. 15 years

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
Start	£650,000	£669,500	£689,585	£710,273	£731,581	£753,528
End	£669,500	£689,585	£710,273	£731,581	£753,528	£776,134
	<b>Year 7</b>	<b>Year 8</b>	<b>Year 9</b>	<b>Year 10</b>	<b>Year 11</b>	<b>Year 12</b>
Start	£776,134	£799,418	£823,401	£848,103	£873,546	£899,752
End	£799,418	£823,401	£848,103	£873,546	£899,752	£926,745
	<b>Year 13</b>	<b>Year 14</b>	<b>Year 15</b>			
Start	£926,745	£954,547	£983,183			
End	£954,547	£983,183	£1,012,679			

## Extension

Offer B by £15.71



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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Calculate the value of a compound interest investment			
AO1	2	Calculate a constant rate of depreciation over time			
AO1	3	Calculate the value of a simple interest investment			
AO1	4	Calculate the amount of compound interest			
AO1	5	Calculate a variable rate of depreciation over time			
AO2	6	Explain the result of repeated percentage increase			
AO2	7	Determine whether simple or compound interest applies			
AO2	8	Explain the result of repeated percentage change			
AO3	9	Solve a simple interest problem			
AO3	10	Solve a compound interest problem			

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