THIRD SPACE
LEARNING

Simple and Compound Interest - Worksheet

Skill

Group A - simple and compound interest calculations

Use the formula $A = P(1 + rt)$ or $A = P(1 + \frac{r}{100})^t$ to calculate the value of A (the new amount):

1) $P = 1000$
$r = 5\%$ per year
Simple interest
$t = 3$ years

2) $P = 500$
$r = 20\%$ per year
Simple interest
$t = 2$ years

3) $P = 2500$
$r = 10\%$ per year
Simple interest
$t = 8$ years

4) $P = 10,000$
$r = 10\%$ per annum
Compound interest
$t = 3$ years

5) $P = 50,000$
$r = 3\%$ per annum
Compound interest
$t = 5$ years

6) $P = 2,500$
$r = -4\%$ per annum
Compound interest
$t = 8$ years

7) $P = 35432$
$r = 2.4\%$ per hour
Simple interest
$t = 14$ hours

8) $P = 134,999$
$r = 0.5\%$ per week
Compound interest
$t = 7$ weeks

9) $P = 3 \times 10^3$
$r = 1\%$ per day
Simple interest
$t = 3$ days

10) $P = 2.4 \times 10^6$
$r = 1.2\%$ per hour
Compound interest
$t = 6.5$ hours

11) $P = 8.54 \times 10^7$
$r = 2\%$ per month
Simple interest
$t = 2$ years

12) $P = 5.42 \times 10^{-6}$
$r = 3\%$ per day
Compound interest,
compounded hourly
$t = 7\frac{1}{2}$ days

Group B - Interest only calculations

Calculate the interest only on the following amounts using simple or compound interest. All interest rates are per annum.

1) 10% simple interest
$P = 100$
3 years

2) 2% simple interest
$P = 250$
4 years

3) 3% simple interest
$P = 300$
8 years

4) 7% simple interest
$P = 10$
5 years

5) 12% simple interest
$P = 23$
3.5 years

6) 1.7% simple interest
$P = 51.30$
18 months

Simple and Compound Interest - Worksheet

Group B continued

7) 20% compound interest
$P = 200$
2 years

8) 5% compound interest
$P = 240$
7 years

9) 4% compound interest
$P = 550$
9 years

10) 31% compound interest
$P = 62$
8 years

11) 3.6% compound interest
$P = 78$
4.25 years

12) 0.3% compound interest
$P = 224.46$
90 months

Group C - Worded problems (simple and compound interest)

Calculate the new value of each amount.

1) An investment grows at a rate of 6% per month simple interest. If the investment is currently £45, how much will it be worth in 6 months?

2) An investment grows at a rate of 3% per year simple interest. If the investment is currently £83, how much will it be worth after 3 years?

3) The value of a savings account increases by 1.8% per month simple interest. If the amount in the account is currently £2799, what will the value be after 6 months?

4) A share price increases at a rate of 0.2% per hour, simple interest. If the share price starts the day worth £6400, how much will it be worth after 1 day?

5) The value of a rare breed of fish is £2700. The value increases by 0.001% simple interest, every minute. How much does the fish cost after 12 hours?

6) The value of an investment increases at a rate of 0.03% per month simple interest. If the investment starts at £4500, how much will it be worth in 5 years?

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Simple and Compound Interest - Worksheet

Group C continued

7) £3, 500 is charged an APR of 17. 5% per annum compound interest. What would this new value be after 6 years if nothing was paid off?

8) The volume of water in a lake is measured at 7, 450L. The amount of water increased by 22% per month compoundly. How much water is in the lake after 14 months?

9) The value of a house worth £360, 075 reduces by 6% per day compoundly. What is the value of the house after 8 days?

10) A population of chickens measures $1. 75 \times 10^{4.}$ The population increases by 24% per annum. What is the population of chickens after 5 years?

11) The number of bottles on a production line is equal to $1. 53 \times 10^{2}$ at one time. The production wants to increase by 3. 6% compoundly per annum. How many bottles should there be on the production line after 5 years?

12) The weight of a termite is approximately $1. 5 \times 10^{-3}$. After a successful season, the weight of each termite increases by 1. 4% compoundly per week. How heavy is each termite after 3. 5 weeks?

Simple and Compound Interest - Worksheet

Applied

1) **(a)** A car is purchased for £12,000 using a finance deal over 24 months. An extra charge of 5% is added onto the total amount. How much interest will be paid on the car per month?

(b) The car depreciates in value on average by 2% every month, compoundly. What is the value of the car after 2 years?

2) **(a)** £400 is invested into a bank account with 0.25% compound interest per month. What is the value of the investment after 1 year?

(b) How many months will the investment be worth £415?

3) **(a)** A ball is dropped from a height of 12m. The ball loses 18% of its height after each bounce. What is the height of the third bounce?

(b) The ball continues to bounce until the height is less than 6m. How many bounces does the ball make before this point?

4) **(a)** The population of snails on an allotment increases at a dramatic rate of 5% per day, compoundly. If the population of snails was 10 at the beginning of the month, what is the new population of snails after 2 weeks?

(b) Throughout the same month, the average loss of vegetation per day was measured at 1.8% of the original amount every day. If there was 3 tonnes of vegetation at the beginning of the month, how much vegetation is left at the end of the month? Write your answer in kilograms.

Simple and Compound Interest - Exam Questions

1) **(a)** £1400 is invested for 3 years.

Interest Rate A: 2. 4% compound interest per annum
Interest Rate B: 0. 2% simple interest per month

Which interest rate would return the greatest amount of interest?

....

(4)

(b) After 5 years with interest rate B, the interest accumulated was £360. What was the initial amount invested?
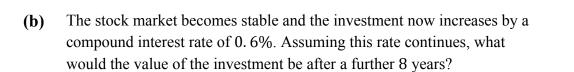
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(2)

(6 marks)

Simple and Compound Interest - Exam Questions

2) **(a)** The value of an investment reaches £17000. A change in the stock market causes the investment to reduce with a simple interest rate of 3% per hour. What is the value of the investment after 3 hours?

…………………

(2)

(b) The stock market becomes stable and the investment now increases by a compound interest rate of 0.6%. Assuming this rate continues, what would the value of the investment be after a further 8 years?

…………………

(2)

(4 marks)

---

3) Two different furniture stores have an offer.

Eat-sy

Save £45

Dine Deluxe

Save 15%

(a) If you could buy the same dining table from each store, what value would the item need to be to save the same amount of money?

…………………

(2)

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Simple and Compound Interest - Exam Questions

(b) A set of 4 dining chairs in Dine Deluxe are bought using a credit card. The original price was £220. The credit card applies a 1.2% interest charge per year. If the item was fully paid for after 1 year, how much money would be saved, compared to the original amount?

....

(3)

(5 marks)

---

4) **(a)** The population of bacteria in a petri dish surpasses 2 million. If the population of bacteria expands at a compound rate of 1.7% per minute. How many bacteria are expected in the petri dish after 5 minutes?

....

(2)

(b) How long will it take for the population to exceed 2500000?

....

(2)

(4 marks)

Simple and Compound Interest - Answers

	Question	Answer
	Skill Questions	
Group A	Use the formula $A = P(1 + rt)$ or $A = P(1 + \frac{r}{100})^t$ to calculate the value of A (the new amount):	
	1) $P = 1000$ $r = 5\%$ per year Simple interest $t = 3$ years	**1)** 1150
	2) $P = 500$ $r = 20\%$ per year Simple interest $t = 2$ years	**2)** 700
	3) $P = 2500$ $r = 10\%$ per year Simple interest $t = 8$ years	**3)** 4500
	4) $P = 10,000$ $r = 10\%$ per annum Compound interest $n = 1$ $t = 3$ years	**4)** 13310
	5) $P = 50,000$ $r = 3\%$ per annum Compound interest $n = 1$ $t = 5$ years	**5)** 57963.70
	6) $P = 2,500$ $r = -4\%$ per annum Compound interest $n = 1$ $t = 8$ years	**6)** 1803.47
	7) $P = 35432$ $r = 2.4\%$ per hour Simple interest $t = 14$ hours	**7)** 47337.152

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Simple and Compound Interest - Answers

Group A contd		
	8) $P = 134,999$ $r = 0.5\%$ per week Compound interest $n = 1$ $t = 7$ weeks	**8)** 139795.43
	9) $P = 3 \times 10^3$ $r = 1\%$ per day Simple interest $t = 3$ days	**9)** 3.09×10^3
	10) $P = 2.4 \times 10^6$ $r = 1.2\%$ per hour Compound interest $n = 1$ $t = 6.5$ hours	**10)** $2.59 \times 10^6 \ (3sf)$
	11) $P = 8.54 \times 10^7$ $r = 2\%$ per month Simple interest $t = 2$ years	**11)** $1.26 \times 10^8 \ (3sf)$
	12) $P = 5.42 \times 10^{-6}$ $r = 3\%$ per day Compound interest , compounded hourly $t = 7\frac{1}{2}$ days	**12)** $6.79 \times 10^{-6} \ (3sf)$
Group B	Calculate the interest only on the following amounts using simple or compound interest. All interest rates are per annum.	
	1) 10% simple interest $P = 100$ 3 years	**1)** 30
	2) 2% simple interest $P = 250$ 4 years	**2)** 20
	3) 3% simple interest $P = 300$ 8 years	**3)** 72

Simple and Compound Interest - Answers

Group B contd			
	4)	7% simple interest $P = 10$ 5 years	**4)** 3.5
	5)	12% simple interest $P = 23$ 3.5 years	**5)** 9.66
	6)	1.7% simple interest $P = 51.30$ 18 months	**6)** 1.31
	7)	20% compound interest $P = 200$ 2 years	**7)** 88
	8)	5% compound interest $P = 240$ 7 years	**8)** 97.70
	9)	4% compound interest $P = 550$ 9 years	**9)** 232.82
	10)	31% compound interest $P = 62$ 8 years	**10)** 475.73
	11)	3.6% compound interest $P = 78$ 4.25 years	**11)** 12.65
	12)	0.3% compound interest $P = 224.46$ 90 months	**12)** 5.10

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Simple and Compound Interest - Answers

Group C	Calculate the new value of each amount.	
	1) An investment grows at a rate of 6% per month simple interest. If the investment is currently £45, how much will it be worth in 6 months?	**1)** £61.20
	2) An investment grows at a rate of 3% per year simple interest. If the investment is currently £83, how much will it be worth after 3 years?	**2)** £90.47
	3) The value of a savings account increases by 1.8% per month simple interest. If the amount in the account is currently £2799, what will the value be after 6 months?	**3)** £3101.29
	4) A share price increases at a rate of 0.2% per hour, simple interest. If the share price starts the day worth £6400, how much will it be worth after 1 day?	**4)** £6707.20
	5) The value of a rare breed of fish is £2700. The value increases by 0.001% simple interest, every minute. How much does the fish cost after 12 hours?	**5)** £2719.44
	6) The value of an investment increases at a rate of 0.03% per month simple interest. If the investment starts at £4500, how much will it be worth in 5 years?	**6)** £4581
	7) £3,500 is charged an APR of 17.5% per annum compound interest. What would this new value be after 6 years if nothing was paid off?	**7)** 9210.76
	8) The volume of water in a lake is measured at 7,450L. The amount of water increased by 22% per month compoundly. How much water is in the lake after 14 months?	**8)** 120557.41

THIRD SPACE
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Simple and Compound Interest - Answers

Group C contd	**9)** The value of a house worth £360, 075 reduces by 6% per day compoundly. What is the value of the house after 8 days?	**9)** 219490. 54
	10) A population of chickens measures 1.75×10^4. The population increases by 24% per annum. What is the population of chickens after 5 years?	**10)** 5.13×10^4
	11) The number of bottles on a production line is equal to 1.53×10^2 at one time. The production wants to increase by 3.6% compoundly per annum. How many bottles should there be on the production line after 5 years?	**11)** 1.83×10^2
	12) The weight of a termite is approximately 1.5×10^{-3}. After a successful season, the weight of each termite increases by 1.4% compoundly per week. How heavy is each termite after 3.5 weeks?	**12)** 1.57×10^{-3}

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THIRD SPACE
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Simple and Compound Interest - Answers

	Question	Answer
	Applied Questions	
1)	**a)** A car is purchased for £12,000 using a finance deal over 24 months. An extra charge of 5% is added onto the total amount. How much interest will be paid on the car per month?	**a)** £600 interest $600 \div 24 = £25$ per month
	b) The car depreciates in value on average by 2% every month, compound interest. What is the value of the car after 2 years?	**b)** 12000×0.98^{24} £7389.36
2)	**a)** £400 is invested into a bank account with 0.25% compound interest per month. What is the value of the investment after 1 year?	**a)** $400 \times (1 + \frac{0.25}{100})^{12}$ £412.17
	b) How many months will the investment be worth £415?	**b)** 15 months
3)	**a)** A ball is dropped from a height of $12m$. The ball loses 18% of its height after each bounce. What is the height of the third bounce?	**a)** 12×0.82^3 $6.62m$
	b) The ball continues to bounce until the height is less than 6m. How many bounces does the ball make before this point?	**b)** 4 bounces
4)	**a)** The population of snails on an allotment increases at a dramatic rate of 5% per day, compoundly. If the population of snails was 10 at the beginning of June, what is the new population of snails after 2 weeks?	**a)** 20
	b) Throughout the same month, the average loss of vegetation per day was measured at 1.8% of the original amount every day. If there was 3 tonnes of vegetation at the beginning of the month, how much vegetation is left at the end of the month? Write your answer in kilograms.	**b)** $3000 \times (1 - 0.018 \times 30)$ $1380kg$

Simple and Compound Interest - Mark Scheme

		Question	Answer	
		Exam Questions		
1)	**(a)**	£1400 is invested for 3 years. Which interest rate would return the greatest amount of interest? Interest Rate A: 2.4% compound interest per annum Interest Rate B: 0.2% simple interest per month	**(a)** Interest Rate A: 1400×1.024^3 £1503.24 Interest Rate B: $1400 \times (1 + (\frac{0.2 \times 3 \times 12}{100}))$ £1500.80	**(1)** **(1)** **(1)** **(1)**
	(b)	After 5 years with interest rate B, the interest accumulated was £360. What was the initial amount invested?	**(b)** $360 / (0.002 \times 5 \times 12)$ £3000	**(1)** **(1)**
2)	**(a)**	The value of an investment reaches £17000. A change in the stock market causes the investment to reduce with a simple interest rate of 3% per hour. What is the value of the investment after 3 hours?	**(a)** $17000 \times (1 - 0.03 \times 3)$ £15470	**(1)** **(1)**
	(b)	The stock market becomes stable and the investment now increases by a compound interest rate of 0.6%. Assuming this rate continues, what would the value of the investment be after a further 8 years?	**(b)** 15470×1.006^8 £16228.34	**(1)** **(1)**

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Simple and Compound Interest - Mark Scheme

3)	**(a)**	Two different furniture stores have an offer. Eat-sy — Save £45 Dine Deluxe — Save 15% If you could buy the same dining table from each store, what value would the item need to be to save the same amount of money?	**(a)**	£45 $=$ 15% £3 $=$ 1% £300 $=$ 100% or £300	**(1)** **(1)**
	(b)	A set of 4 dining chairs in Dine Deluxe is bought using a credit card. The original price was £220. The credit card applies a 1.2% interest charge per year. If the item was fully paid for after 1 year, how much money would be saved, compared to the original amount?	**(b)**	$220 \times 0.85 = £187$ $187 \times 1.012 = £189.24$ $220 - 189.24 = £30.76$ saved	**(1)** **(1)** **(1)**
4)	**(a)**	The population of bacteria in a petri dish surpasses 2 million. If the population of bacteria expands at a compound rate of 1.7% per minute. How many bacteria are expected in the petri dish after 5 minutes?	**(a)**	2000000×1.017^5 2175879	**(1)** **(1)**
	(b)	How long will it take for the population to exceed 2500000?	**(b)**	At least 2 attempts of 2000000×1.017^n seen $n = 14$ minutes	**(1)** **(1)**

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