

MATHS



MODEL ANSWERS

AER AND APR

SCORE

/92

PERCENTAGE

%

STEMUP

- 1 Huw borrows £6,000 over 3 years at an APR of 9.9%.
The monthly repayment is £193.32.
Work out the total amount he repays.

$$3 \times 12 = 36 \text{ payments}$$

$$36 \times £193.32 = £6,959.52$$

£6,959.52

1 / 1

- 2 Evan has a credit card with an APR of 29.9%.
He has a balance of £1,200 on the card and makes no payments for the whole of the next year.
Assume no new spending and that the APR does not change.
Work out the interest charged on the balance in one year.

$$\text{APR is the interest for a whole year: } 29.9\% \text{ of } £1,200 = £358.80$$

£358.80

1 / 1

- 3 What does AER stand for?

$$\text{AER} = \text{Annual Equivalent Rate}$$

Annual Equivalent Rate

1 / 1

- 4 Lowri borrows £15,000 over 4 years at an APR of 9.9%.

The monthly repayment is £379.72.

Work out the total cost of the credit (the amount repaid minus the amount borrowed).

$$\text{Total repaid} = 48 \times £379.72 = £18,226.56$$

$$\text{cost of credit} = £18,226.56 - £15,000 =$$

$$£3,226.56$$

£3,226.56

1 / 1

- 5 Jess has a credit card with an APR of 22.4%.

She has a balance of £600 on the card and makes no payments for the whole of the next year.

Assume no new spending and that the APR does not change.

Work out the interest charged on the balance in one year.

APR is the interest for a whole year: 22.4% of

$$£600 = £134.40$$

£134.40

1 / 1

- 6 Give one reason why the APR on a loan helps a borrower to compare loans.

APR is a standard measure of the yearly cost of credit

It shows the yearly cost of borrowing as a percentage, including interest (and some fees), so loans can be compared fairly

1 / 1

- 7 Dylan borrows £12,000 over 4 years at an APR of 8.9%.

The monthly repayment is £298.05.

Work out the total cost of the credit (the amount repaid minus the amount borrowed).

$$\text{Total repaid} = 48 \times £298.05 = £14,306.40$$

$$\text{cost of credit} = £14,306.40 - £12,000 =$$

$$£2,306.40$$

£2,306.40

1 / 1

- 8 Jess has a credit card with an APR of 19.9%.

She has a balance of £1,500 on the card and makes no payments for the whole of the next year.

Assume no new spending and that the APR does not change.

Work out the interest charged on the balance in one year.

APR is the interest for a whole year: 19.9% of

$$£1,500 = £298.50$$

£298.50

1 / 1

- 9 First Access Bank pays a nominal interest rate of 3% per annum on a savings account.

Interest is compounded quarterly.

Use the formula:

$\text{AER} = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Calculate the AER, as a percentage correct to 2 decimal places.

$$i = 0.03, n = 4$$

$$\text{AER} = (1 + 0.03 \div 4)^4 - 1 = 0.030339 =$$

$$3.03\%$$

3.03%

1 / 1

- 10** Valley Bank pays interest of 0.45% each month, compounded monthly.
The nominal interest rate per annum is $12 \times 0.45\% = 5.4\%$.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Work out the AER, as a percentage correct to 2 decimal places.

$$i = 0.054$$

$$n = 12$$

$$AER = (1 + 0.054 \div 12)^{12} - 1 = 5.536\%$$

5.54%

/ 1

- 11** Tomos has a credit card with an APR of 22.4%.
He has a balance of £400 on the card and makes no payments for the whole of the next year.
Assume no new spending and that the APR does not change.
Work out the interest charged on the balance in one year.

*APR is the interest for a whole year: 22.4% of
£400 = £89.60*

£89.60

/ 1

- 12** Cymru Savings pays a nominal interest rate of 4.5% per annum on a savings account.
Interest is compounded half-yearly.
Use the formula:

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Calculate the AER, as a percentage correct to 2 decimal places.

$$i = 0.045, n = 2$$

$$AER = (1 + 0.045 \div 2)^2 - 1 = 0.045506 = 4.55\%$$

4.55%

/ 1

- 13 Banc y Bobl pays interest of 0.32% each month, compounded monthly.
The nominal interest rate per annum is $12 \times 0.32\% = 3.84\%$.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Work out the AER, as a percentage correct to 2 decimal places.

$$i = 0.0384$$

$$n = 12$$

$$AER = (1 + 0.0384 \div 12)^{12} - 1 = 3.908\%$$

3.91%

1 / 1

- 14 Callum puts £3,000 into a savings account with an AER of 4.6%.
No money is paid in or taken out.
Work out the amount in the account after 5 years.
Give your answer to the nearest penny.

$$£3,000 \times 1.046^5 = £3,756.47$$

£3,756.47

1 / 1

- 15 Valley Bank pays a nominal interest rate of 4.2% per annum on a savings account.
Interest is compounded monthly.
Use the formula:

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Calculate the AER, as a percentage correct to 2 decimal places.

$$i = 0.042, n = 12$$

$$AER = (1 + 0.042 \div 12)^{12} - 1 = 0.042818 = 4.28\%$$

4.28%

1 / 1

- 16** Evan has a credit card with an APR of 18.9%.
 He has a balance of £500 on the card and makes no payments for the whole of the next year.
 Assume no new spending and that the APR does not change.
 Work out the amount owed at the end of 2 years if nothing is paid.
 Give your answer to the nearest penny.

$$£500 \times 1.189^2 = £706.86$$

£706.86

/ 1

- 17** Priya invests £6,500 in an account with a nominal interest rate of 4.8% per annum.
 Interest is compounded half-yearly.

$$\text{AER} = \left(1 + \frac{i}{n}\right)^n - 1$$
, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.
 Work out the interest she earns in one year.
 Give your answer to the nearest penny.

$$\begin{aligned} \text{AER} &= (1 + 0.048 \div 2)^2 - 1 = 0.048576 \\ \text{interest} &= 0.048576 \times £6,500 = £315.74 \end{aligned}$$

£315.74

/ 1

- 18** Cymru Savings pays a nominal interest rate of 3.6% per annum on a savings account.
 Interest is compounded monthly.
 Use the formula:

$$\text{AER} = \left(1 + \frac{i}{n}\right)^n - 1$$
, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.
 Calculate the AER, as a percentage correct to 2 decimal places.

$$\begin{aligned} i &= 0.036, n = 12 \\ \text{AER} &= (1 + 0.036 \div 12)^{12} - 1 = 0.036600 = \\ &3.66\% \end{aligned}$$

3.66%

/ 1

- 19 Carys puts £3,000 into a savings account with an AER of 5.2%.
No money is paid in or taken out.
Work out the total interest earned after 3 years.
Give your answer to the nearest penny.

$$\text{Amount} = £3,000 \times 1.052^3 = £3,492.76$$

$$\text{interest} = £3,492.76 - £3,000 = £492.76$$

£492.76

1 / 1

- 20 Nerys invests £5,000 in an account with a nominal interest rate of 3.6% per annum.
Interest is compounded monthly.

AER = $(1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Work out the interest she earns in one year.

Give your answer to the nearest penny.

$$\text{AER} = (1 + 0.036 \div 12)^{12} - 1 = 0.036600$$

$$\text{interest} = 0.036600 \times £5,000 = £183.00$$

£183.00

1 / 1

- 21 A savings account has a nominal rate of 4.8% compounded monthly. State whether its AER is greater than, less than or equal to 4.8%, and explain why.

$$n = 12, \text{ so the AER} = (1 + 0.048 \div 12)^{12} - 1 = 4.91\%$$

Greater than 4.8%, because
interest is compounded more
than once a year

2 / 2

- 22 Lowri compares two savings accounts.

Banc y Bobl: nominal interest rate 5% per annum, compounded monthly.

Taf Credit Union: AER 4.30%.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Which account pays more interest? Show how you decide.

$$\text{Banc y Bobl: } AER = (1 + 0.05 \div 12)^{12} - 1 = 5.12\%$$

compare with 4.30%

Banc y Bobl (AER 5.12%
compared with 4.30%)

2 / 2

- 23 Ioan invests £3,000 in an account with a nominal interest rate of 4.2% per annum.

Interest is compounded half-yearly.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Work out the interest he earns in one year.

Give your answer to the nearest penny.

$$AER = (1 + 0.042 \div 2)^2 - 1 = 0.042441$$

$$\text{interest} = 0.042441 \times £3,000 = £127.32$$

£127.32

2 / 2

- 24 Osian wants to save money in a bank account. Two banks offer these accounts.

Castell Bank: nominal interest rate 4.8% per annum, interest compounded monthly.

Severn Savings: nominal interest rate 5.12% per annum, interest compounded quarterly.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

By comparing AERs, decide which bank Osian should choose to receive the most interest per annum.

You must show all your working.

$$\text{Castell Bank: } (1 + 0.048 \div 12)^{12} - 1 = 4.91\%$$

$$\text{Severn Savings: } (1 + 0.0512 \div 4)^4 - 1 = 5.22\%$$

Severn Savings has the higher AER

Severn Savings (AER 5.22%
compared with 4.91%)

2 / 2

- 25 Huw compares two savings accounts.

Castell Bank: nominal interest rate 4.5% per annum, compounded half-yearly.

Banc y Bobl: AER 4.90%.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Which account pays more interest? Show how you decide.

$$\text{Castell Bank: } AER = (1 + 0.045 \div 2)^2 - 1 = 4.55\%$$

compare with 4.90%

Banc y Bobl (AER 4.90%
compared with 4.55%)

2 / 2

- 26 Nia compares two credit cards.

Card A: APR 22.9%, no annual fee.

Card B: APR 17.9%, annual fee of £36.

She expects to owe £2,000 on the card for a whole year.

Which card is cheaper for the year? Show how you decide.

$$\text{Card A: } 22.9\% \text{ of } £2,000 = £458.00$$

$$\text{card B: } 17.9\% \text{ of } £2,000 = £358.00, \text{ plus } £36 = £394.00$$

Card B (£394.00 compared with
£458.00)

2 / 2

- 27 Sam wants to save money in a bank account. Two banks offer these accounts.

Cymru Savings: nominal interest rate 4.9% per annum, interest compounded quarterly.

Taf Credit Union: nominal interest rate 5.05% per annum, interest compounded half-yearly.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

By comparing AERs, decide which bank Sam should choose to receive the most interest per annum.

You must show all your working.

$$\text{Cymru Savings: } (1 + 0.049 \div 4)^4 - 1 = 4.99\%$$

$$\text{Taf Credit Union: } (1 + 0.0505 \div 2)^2 - 1 = 5.11\%$$

Taf Credit Union has the higher AER

Taf Credit Union (AER 5.11%
compared with 4.99%)

2 / 2

- 28 Evan takes out a loan of £12,000 for a caravan. The loan has an APR of 7.5%.
The monthly interest rate is the APR divided by 12.
The loan is repaid in equal monthly payments over 6 years.
The formula for calculating the monthly repayment on a loan is

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Work out the monthly repayment, correct to the nearest penny.

$$r = 0.07500 \div 12 = 0.0062500$$

$$n = 6 \times 12 = 72$$

$$M = 0.0062500 \times 12,000 \div (1 - (1 + 0.0062500)^{-72}) = £207.48$$

£207.48

2 / 2

- 29 Cerys compares two credit cards.
Card A: APR 26.9%, no annual fee.
Card B: APR 21.9%, annual fee of £40.
She expects to owe £1,000 on the card for a whole year.
Which card is cheaper for the year? Show how you decide.

$$\text{Card A: } 26.9\% \text{ of } £1,000 = £269.00$$

$$\text{card B: } 21.9\% \text{ of } £1,000 = £219.00, \text{ plus } £40 = £259.00$$

Card B (£259.00 compared with £269.00)

2 / 2

- 30 Aled wants to save money in a bank account. Two banks offer these accounts.
Taf Credit Union: nominal interest rate 4.9% per annum, interest compounded quarterly.
Castell Bank: nominal interest rate 4.95% per annum, interest compounded monthly.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

By comparing AERs, decide which bank Aled should choose to receive the most interest per annum.

You must show all your working.

$$\text{Taf Credit Union: } (1 + 0.049 \div 4)^4 - 1 = 4.99\%$$

$$\text{Castell Bank: } (1 + 0.0495 \div 12)^{12} - 1 = 5.06\%$$

Castell Bank has the higher AER

Castell Bank (AER 5.06% compared with 4.99%)

2 / 2

- 31 Nia takes out a loan of £8,000 for home improvements. The loan has an APR of 5.9%.
The monthly interest rate is the APR divided by 12.
The loan is repaid in equal monthly payments over 2 years.
The formula for calculating the monthly repayment on a loan is

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Work out the monthly repayment, correct to the nearest penny.

$$r = 0.05900 \div 12 = 0.0049167$$

$$n = 2 \times 12 = 24$$

$$M = 0.0049167 \times 8,000 \div (1 - (1 + 0.0049167)^{-24}) = £354.20$$

£354.20

2 / 2

- 32 Osian has £4,000 to save for one year.
Account A: nominal rate 4.2% per annum, compounded quarterly.
Account B: AER 5.30%.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Work out how much more interest Osian earns in the better account.

Give your answer to the nearest penny.

$$\text{Account A AER} = 4.267\%$$

$$\text{interest A} = £170.66$$

$$\text{interest B} = 5.30\% \text{ of } £4,000 = £212.00$$

$$\text{difference} = £41.34$$

£41.34

2 / 2

- 33 Valley Bank advertises an AER of 3.0225%.
Interest is compounded half-yearly.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Work out the nominal interest rate per annum, as a percentage correct to 1 decimal place.

You must show all your working.

$$1 + AER = 1.030225$$

$$(1.030225)^{1 \div 2} = 1 + i \div 2$$

$$i = 2 \times (1.015000 - 1) = 0.0300$$

3.0%

2 / 2

- 34 Priya takes out a loan of £17,000 for a kitchen. The loan has an APR of 12.9%.
The monthly interest rate is the APR divided by 12.
The loan is repaid in equal monthly payments over 3 years.
The formula for calculating the monthly repayment on a loan is

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Work out the monthly repayment, correct to the nearest penny.

$$r = 0.12900 \div 12 = 0.0107500$$

$$n = 3 \times 12 = 36$$

$$M = 0.0107500 \times 17,000 \div (1 - (1 + 0.0107500)^{-36}) = £571.98$$

£571.98

2 / 2

- 35 Sasha has £3,000 to save for one year.
Account A: nominal rate 4.5% per annum, compounded quarterly.
Account B: AER 5.30%.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Work out how much more interest Sasha earns in the better account.

Give your answer to the nearest penny.

$$\text{Account A AER} = 4.577\%$$

$$\text{interest A} = £137.30$$

$$\text{interest B} = 5.30\% \text{ of } £3,000 = £159.00$$

$$\text{difference} = £21.70$$

£21.70

2 / 2

- 36 First Access Bank advertises an AER of 4.4484%.
Interest is compounded half-yearly.

$AER = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Work out the nominal interest rate per annum, as a percentage correct to 1 decimal place.

You must show all your working.

$$1 + AER = 1.044484$$

$$(1.044484)^{1 \div 2} = 1 + i \div 2$$

$$i = 2 \times (1.022000 - 1) = 0.0440$$

4.4%

2 / 2

- 37 Ceri buys a house for £200,000. She pays a deposit of 15% and takes out a mortgage for the rest.

The mortgage has an APR of 4.9% and is repaid over 25 years.

The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Work out the monthly repayment, to the nearest penny.

$$\text{Mortgage} = £200,000 \times 85\% = £170,000$$

$$r = 0.0040833$$

$$n = 300$$

$$M = £983.92$$

£983.92

2 / 2

- 38 Liam has £5,000 to save for one year.

Account A: nominal rate 5% per annum, compounded quarterly.

Account B: AER 5.20%.

$\text{AER} = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Work out how much more interest Liam earns in the better account.

Give your answer to the nearest penny.

$$\text{Account A AER} = 5.095\%$$

$$\text{interest A} = £254.73$$

$$\text{interest B} = 5.20\% \text{ of } £5,000 = £260.00$$

$$\text{difference} = £5.27$$

£5.27

2 / 2

- 39 Castell Bank advertises an AER of 4.4731%.

Interest is compounded quarterly.

$\text{AER} = (1 + \frac{i}{n})^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.

Work out the nominal interest rate per annum, as a percentage correct to 1 decimal place.

You must show all your working.

$$1 + \text{AER} = 1.044731$$

$$(1.044731)^{1 \div 4} = 1 + i \div 4$$

$$i = 4 \times (1.011000 - 1) = 0.0440$$

4.4%

3 / 3

- 40 Huw buys a house for £220,000. He pays a deposit of 15% and takes out a mortgage for the rest.

The mortgage has an APR of 4.9% and is repaid over 30 years.

The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Work out the total interest he pays over the 30 years.

Give your answer to the nearest pound.

$$\text{Mortgage} = £187,000$$

$$M = £992.46$$

$$\text{total repaid} = 360 \times £992.46 = £357,285.60$$

$$\text{interest} = £357,285.60 - £187,000 = £170,285.60$$

$$£170,286$$

3 / 3

- 41 Gareth borrows £15,000 at an APR of 8.9%.

The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

(a) Work out the monthly repayment if the loan is repaid over 7 years. Give your answer to the nearest penny.

(b) The monthly repayment over 5 years is £310.65. Work out how much less is repaid in total over 5 years than over 7 years.

$$(a) r = 0.0074167$$

$$n = 84$$

$$M = £240.58, (b) 7 \times 12 \times £240.58 = £20,208.72$$

$$5 \times 12 \times £310.65 = £18,639.00$$

$$\text{difference} = £1,569.72$$

$$(a) £240.58 (b) £1,569.72$$

3 / 3

- 42 Lowri wants to borrow £10,000 for 3 years and is offered a loan by two lenders.

Menai Bank: APR 6.9%. First Access Bank: APR 8.4%.

The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Which lender should Lowri choose? Work out how much less she repays in total with this lender.

You must show all your working.

$$\text{Menai Bank: monthly repayment } £308.31, \text{ total } £11,099.16$$

$$\text{First Access Bank: monthly repayment } £315.21, \text{ total } £11,347.56$$

$$\text{Menai Bank has the lower APR so is cheaper}$$

$$\text{difference } £248.40$$

$$\text{Menai Bank; } £248.40 \text{ less}$$

3 / 3

- 43 Owen buys a house for £150,000. He pays a deposit of 5% and takes out a mortgage for the rest.

The mortgage has an APR of 5.2% and is repaid over 20 years.

The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Work out the total interest he pays over the 20 years.

Give your answer to the nearest pound.

$$\text{Mortgage} = £142,500$$

$$M = £956.25$$

$$\text{total repaid} = 240 \times £956.25 = £229,500.00$$

$$\text{interest} = £229,500.00 - £142,500 = £87,000.00$$

$$£87,000$$

3 / 3

- 44 Rhys borrows £12,000 at an APR of 6.5%.

The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

(a) Work out the monthly repayment if the loan is repaid over 4 years. Give your answer to the nearest penny.

(b) The monthly repayment over 3 years is £367.79. Work out how much less is repaid in total over 3 years than over 4 years.

$$(a) r = 0.0054167$$

$$n = 48$$

$$M = £284.58, (b) 4 \times 12 \times £284.58 = £13,659.84$$

$$3 \times 12 \times £367.79 = £13,240.44$$

$$\text{difference} = £419.40$$

$$(a) £284.58 (b) £419.40$$

3 / 3

- 45 Jon wants to borrow £12,000 for 3 years and is offered a loan by two lenders.

Castell Bank: APR 8.5%. First Access Bank: APR 11%.

The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Which lender should Jon choose? Work out how much less he repays in total with this lender.

You must show all your working.

$$\text{Castell Bank: monthly repayment } £378.81, \text{ total } £13,637.16$$

$$\text{First Access Bank: monthly repayment } £392.86, \text{ total } £14,142.96$$

$$\text{Castell Bank has the lower APR so is cheaper}$$

$$\text{difference } £505.80$$

$$\text{Castell Bank; } £505.80 \text{ less}$$

3 / 3

- 46 Bethan buys a house for £220,000. She pays a deposit of 15% and takes out a mortgage for the rest.

The mortgage has an APR of 5.6% and is repaid over 20 years.

The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Work out the total interest she pays over the 20 years.

Give your answer to the nearest pound.

$$\text{Mortgage} = £187,000$$

$$M = £1,296.93$$

$$\text{total repaid} = 240 \times £1,296.93 = £311,263.20$$

$$\text{interest} = £311,263.20 - £187,000 = £124,263.20$$

$$£124,263$$

3 / 3

- 47 Sian borrows £20,000 at an APR of 8.9%.

The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

(a) Work out the monthly repayment if the loan is repaid over 7 years. Give your answer to the nearest penny.

(b) The monthly repayment over 5 years is £414.20. Work out how much less is repaid in total over 5 years than over 7 years.

$$(a) r = 0.0074167$$

$$n = 84$$

$$M = £320.77. (b) 7 \times 12 \times £320.77 = £26,944.68$$

$$5 \times 12 \times £414.20 = £24,852.00$$

$$\text{difference} = £2,092.68$$

$$(a) £320.77 (b) £2,092.68$$

3 / 3

- 48 Gwen wants to borrow £8,000 for 5 years.

Loan A has an APR of 9.9% and no fee.

Loan B has an APR of 7.9% and a fee of £100.

The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Which loan costs less in total? Show how you decide.

$$A: M = £169.58, \text{ total} = 60 \times £169.58 = £10,174.80$$

$$B: M = £161.83, \text{ total} = 60 \times £161.83 + £100 = £9,809.80$$

$$\text{Loan B (£9,809.80 compared with £10,174.80)}$$

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- 49 Mari wants to borrow £10,000 for 3 years.
 Loan A has an APR of 9.9% and no fee.
 Loan B has an APR of 8.9% and a fee of £250.
 The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Which loan costs less in total? Show how you decide.

A: $M = £322.20$, $total = 36 \times £322.20 = £11,599.20$

B: $M = £317.53$, $total = 36 \times £317.53 + £250 = £11,681.08$

Loan A (£11,599.20 compared with £11,681.08)

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- 50 Liam wants to borrow £5,000 for 3 years.
 Loan A has an APR of 10.9% and no fee.
 Loan B has an APR of 6.9% and a fee of £150.
 The monthly interest rate is the APR divided by 12.

$M = \frac{rL}{1 - (1 + r)^{-n}}$, where r is the monthly interest rate as a decimal, L is the amount borrowed and n is the number of monthly payments.

Which loan costs less in total? Show how you decide.

A: $M = £163.46$, $total = 36 \times £163.46 = £5,884.56$

B: $M = £154.16$, $total = 36 \times £154.16 + £150 = £5,699.76$

Loan B (£5,699.76 compared with £5,884.56)

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