

R9. Percentage Incr/Decr CALCULATOR

OCR

- 7 At the start of 2017 there are 4000 fish in a lake.
Each year, the number of fish increases by 20% of 4000.

Find the number of fish at the end of 2019.

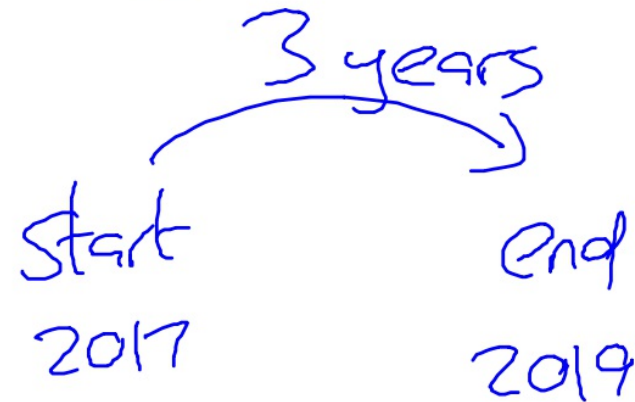
..... [3]

- 7 At the start of 2017 there are 4000 fish in a lake.
Each year, the number of fish increases by 20% of 4000.

Find the number of fish at the end of 2019.

$$20\% \text{ of } 4000$$
$$= 800 \text{ every year}$$

$$4000 + 2400$$



$$3 \text{ years} \times 800$$
$$= 2400 \text{ fish}$$

$$6400 \text{ fish} \dots [3]$$

15 Luka invests £1500.

At the end of the first year, 2% interest is added.

At the end of the second year, after interest has been added, the investment is worth £1606.50.

Show that 5% interest has been added at the end of the second year.

[4]

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Show that 5% interest has been added at the end of the second year.

[4]

$$£1500 \xrightarrow{\quad} 1530 \xrightarrow{+£76.50} = £1606.50$$

$$2\% \text{ of } £1500 =$$

$$5\% \text{ of } 1530 = £76.50$$

$$£1500 \times 1.02 \times 1.05 =$$

- 15** In July the price of a holiday is £500.
In August the price increases by 25%.
In September the price drops to £500 again.

R6

R9a

Work out the percentage decrease from the August price to the September price.

..... % **[4]**

- 15 In July the price of a holiday is £500.
 In August the price increases by 25%.
 In September the price drops to £500 again.

R6
R9a

Work out the percentage decrease from the August price to the September price.

$$\text{July} = \pounds 500$$

$$25\% \text{ of } \pounds 500 = \pounds 125$$

$$\text{August} = \pounds 625$$

$$\% \text{ decrease} = \frac{\text{diff}}{\text{original}} \times 100$$

$$\begin{array}{l} \text{August} \rightarrow \text{Sept} \\ 625 \quad 500 \end{array} = \frac{125}{625} \times 100$$

=

$$20\%$$

..... % [4]

This table shows the ticket price for each person to visit a zoo in winter.

Type of ticket	Ticket price
Adult (aged 18 and over)	£18
Child (aged 3 to 17)	£14
Child (aged below 3)	Free

(b) In summer, the zoo increases the prices.

R9

An Adult ticket increases by 20%.
A Child ticket increases by 15%.

How much more does it cost the family to visit in the summer than in the winter?

(b) £ [4]

This table shows the ticket price for each person to visit a zoo in winter.

Type of ticket	Ticket price
Adult (aged 18 and over)	£18
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(b) In summer, the zoo increases the prices.

R9

An Adult ticket increases by 20%.
 A Child ticket increases by 15%.

How much more

2 x £3.60

1 x £2.10

£9.30

How much more does it cost the family to visit in the summer than in the winter?

Adult ... 20% of £18 = £3.60

*£3.60
x2*

*15% of £14
= £2.10*

9.30 ✓

(b) £ [4]

Edexcel

11 Jack's driving school has two offers.

Offer 1

First driving lesson free

All other driving lessons normal price

Offer 2

All driving lessons

5% off the normal price

The normal price of a driving lesson is £24

Douglas is going to have 12 driving lessons.

Which is the cheaper offer for 12 driving lessons, Offer 1 or Offer 2?

You must show how you get your answer.

(Total for Question 11 is 3 marks)

11 Jack's driving school has two offers.

Created by W Neill

Offer 1
First driving lesson free
All other driving lessons normal price

Offer 2
All driving lessons
5% off the normal price

Offer 1
is cheaper ✓

The normal price of a driving lesson is £24

Douglas is going to have 12 driving lessons.

Which is the cheaper offer for 12 driving lessons, Offer 1 or Offer 2?

You must show how you get your answer.

$$\text{free} + \frac{\text{Offer 1}}{(11 \times £24)} = £264$$

=

Offer 2
 $12 \times £24 = £288$

5% of £288
= £14.40
Cost £288 - 14.40
= £273.60

(Total for Question 11 is 3 marks)

18 Bill wants to increase 150 by 3%
He writes down

R9b

$$150 \times 1.3 = 195$$

Bill's method is wrong.

(a) Explain why.

.....

.....

(1)

Sally wants to decrease 150 by 3%

(b) Complete this statement to show how Sally can decrease 150 by 3%

$$150 \times \dots\dots\dots = \dots\dots\dots$$

(1)

- 18 Bill wants to increase 150 by 3%
He writes down

R9b

$$150 \times 1.3 = 195$$

Bill's method is wrong.

- (a) Explain why.

He has increased it by 30%.
should be 1.03

$$\begin{array}{ccc} -0.03 & & +0.03 \\ \leftarrow & | & \rightarrow \end{array} \quad (1)$$

Sally wants to decrease 150 by 3%

- (b) Complete this statement to show how Sally can decrease 150 by 3%

$$150 \times 0.97 = 145.5$$

(1)

14 $g = \frac{Gm}{r^2}$

- R6 The value of r is decreased by 20%
- R9 The value of G and the value of m are not changed.

Calculate the percentage increase in the value of g .

.....%

(Total for Question 14 is 3 marks)

$$14 \quad g = \frac{Gm}{r^2}$$

$$20\% \text{ of } 10 = 2$$

$$10 - 2 = 8$$

Make up some numbers

R6 The value of r is decreased by 20%

R9 The value of G and the value of m are not changed.

Calculate the percentage increase in the value of g .

$$G = 100$$

$$M = 50$$

$$r = 10$$

$$g = \frac{Gm}{r^2}$$

$$g = \frac{100 \times 50}{10^2}$$

$$g = 50$$

$$g = \frac{Gm}{r^2}$$

$$g = \frac{100 \times 50}{8^2}$$

$$g = 78.125$$

$$\% \text{ increase} = \frac{\text{diff}}{\text{org}} \times 100$$

$$\frac{28.125}{50} \times 100$$

$$56.25\%$$

(Total for Question 14 is 3 marks)

$$9 \quad T = \sqrt{\frac{w}{d^3}}$$

$$w = 5.6 \times 10^{-5}$$

$$d = 1.4 \times 10^{-4}$$

w is increased by 10%

d is increased by 5%

Lottie says,

“The value of T will increase because both w and d are increased.”

(b) Lottie is wrong.

Explain why.

R9b
NSO

$$9 \quad T = \sqrt{\frac{w}{d^3}}$$

$$w = 5.6 \times 10^{-5}$$

$$d = 1.4 \times 10^{-4}$$

$$w = \times 1.1 = 6.16 \times 10^{-5}$$

$$d = \times 1.05 = 1.47 \times 10^{-4}$$

w is increased by 10%

d is increased by 5%

Lottie says,

“The value of T will increase because both w and d are increased.”

(b) Lottie is wrong.

Explain why.

R96
NSO

$$T = 4403 \quad 4403 < 4517 \quad \checkmark$$

11 In 2003, Jerry bought a house.

R9b In 2007, Jerry sold the house to Mia.

R12 He made a profit of 20%

In 2012, Mia sold the house for £162 000

She made a loss of 10%

Work out how much Jerry paid for the house in 2003

£.....

(Total for Question 11 is 3 marks)

11 In 2003, Jerry bought a house.

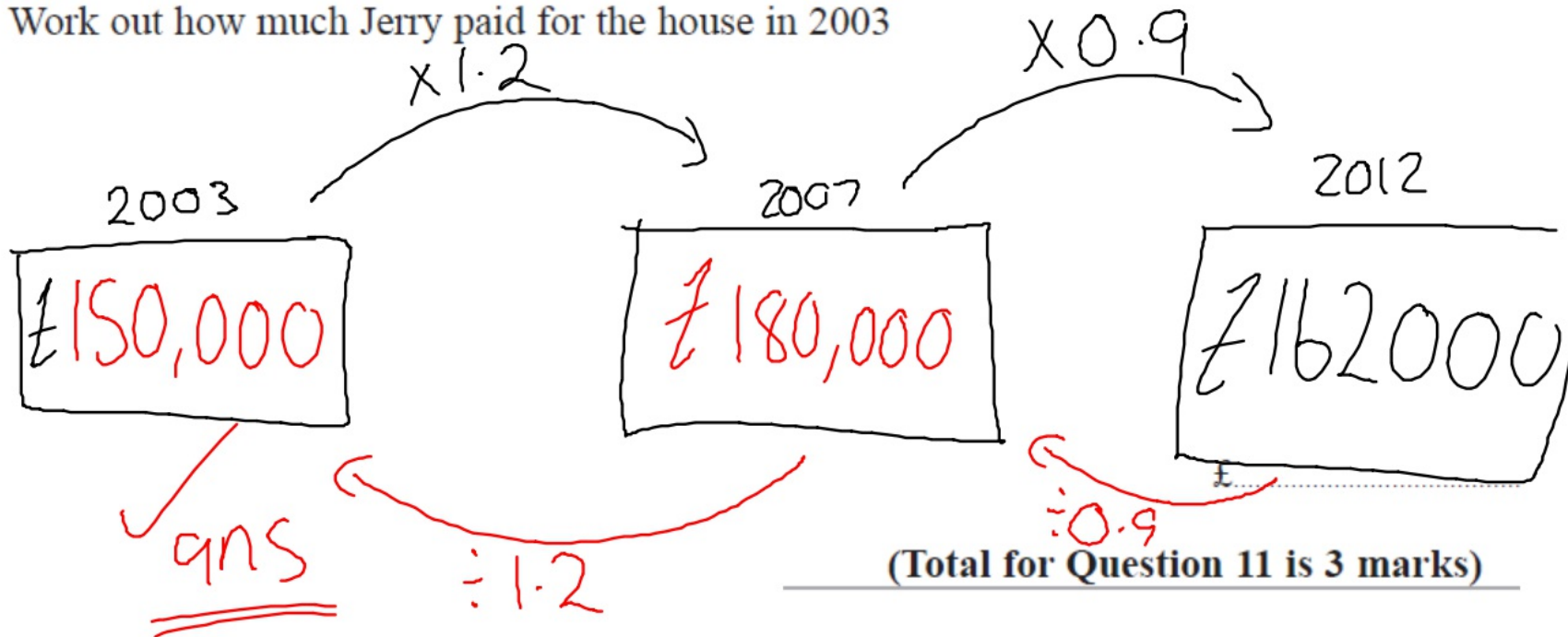
R9b In 2007, Jerry sold the house to Mia.

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Work out how much Jerry paid for the house in 2003



AQA

20 In 2015, Han was paid £1350 per month.

N13 In 2016, he

R9a had a 2% increase in his monthly pay
worked 37.5 hours per week
worked for 47 weeks.

Work out Han's average pay **per hour** for 2016

[5 marks]

Answer £ _____

20

In 2015, Han was paid £1350 per month.

Video created by W Neill

In 2016, he

N13

had a 2% increase in his monthly pay ✓

R9a

worked 37.5 hours per week

worked for 47 weeks.

Work out Han's average pay per hour for 2016

$\div 47 \rightarrow$ £16524 year
 \rightarrow £351.57... week
 $\div 37.5 \rightarrow$ £9.375 [5 marks] 1hr
 $\div 37.5$

2% of £1350 ... new monthly pay
 / + 27
 £27

 £1377 ... new monthly $\times 12$

Yearly ... 1377×12
 $= £16524$

Answer £ 9.38

17 (a) Laura wants to work out 3% of 1700

R9b

Her method is 1700×0.3

Is her method correct?

Tick a box.

Yes

No

Give a reason for your answer.

[1 mark]

17 (a) Laura wants to work out 3% of 1700

R9b

Her method is 1700×0.3

Is her method correct?

Tick a box.

Yes

No

Give a reason for your answer.

[1 mark]

$\times 0.3$ is finding 30%.

$\times 0.03$ is finding 3%.

25

Doug owes an amount of £600

He wants to pay back this amount in five months.

R7

R9a

R11

He says,

“Each month, I will pay back 20% of the amount I still owe.”

Show working to check if his method is correct.

[3 marks]

25

Doug owes an amount of £600

He wants to pay back this amount in five months.

R7

R9a

R11

He says,

"Each month, I will pay back 20% of the amount I still owe."

Show working to check if his method is correct.

[3 marks]

$$\begin{array}{r}
 \text{£600} \\
 \text{1st 20\%} \\
 \underline{-120} \\
 \text{=£480}
 \end{array}
 \qquad
 \begin{array}{r}
 \text{2nd month} \\
 \underline{\hspace{1cm}} \\
 \text{=}
 \end{array}
 \qquad
 \begin{array}{r}
 \text{£600} \times 0.8^5 = \text{£196} \\
 \text{So won't} \\
 \text{have it paid.}
 \end{array}$$

The normal price of a cooker is £540

Sale price
60% off normal price

Stan has to work out the sale price of the cooker.

Here is his working.

$$10\% \text{ of } 540 = 54$$

$$6 \times 54 = 324$$

$$\text{Sale price} = \text{£}324$$

Stan's answer is wrong.

(b) What mistake has Stan made?

R9

.....

.....

The normal price of a cooker is £540

Sale price
60% off normal price

Stan has to work out the sale price of the cooker.

Here is his working.

$$\begin{aligned} 10\% \text{ of } 540 &= 54 \checkmark \\ 6 \times 54 &= 324 \checkmark \\ \text{Sale price} &= \text{£}324 \times \end{aligned}$$

Stan's answer is wrong.

(b) What mistake has Stan made?

R9

$$\begin{aligned} \text{Sale price should be } & \text{£}540 - \text{£}324 \\ & = \text{£}216 \end{aligned}$$

(1)

20

w is a positive number.

R9a

x is 10% more than w .

y is 10% less than x .

Which statement is true?

Tick **one** box. [1 mark]

$w < x$ and $w < y$

$w < x$ and $w = y$

$x > y$ and $w > y$

$x > y$ and $w = y$

20

w is a positive number.

R9a

x is 10% more than w .

y is 10% less than x .

Which statement is true?

Tick **one** box. [1 mark]

$$w = 100$$

$$x = 110$$

$$y = 99$$

$$10\% \text{ of } 110 = 11$$

$$w < x \checkmark \text{ and } w < y \times$$

$$w < x \checkmark \text{ and } w = y \times$$

$$x > y \checkmark \text{ and } w > y \checkmark$$

$$x > y \text{ and } w = y$$