Q1.

A ball is dropped from a height of 50 metres.
After each bounce, the ball reaches 20% of its previous height.

How high does it reach after the second bounce?
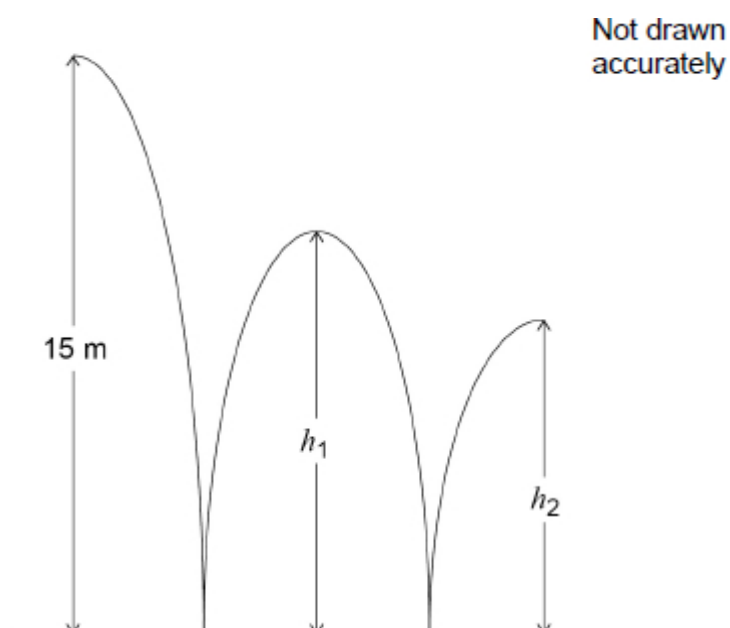
_____

_____

_____

_____

Answer .... metres

(Total 2 marks)

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Calculator

Q2.

A ball is thrown from a height of 15 metres.

It bounces to height h_1, then to height h_2 as shown.

Not drawn accurately

h_1 is three quarters of the original height.

(a)   Jack expects h_2 to be three quarters of h_1

Work out the value of h_2 that he expects.

_____

_____

_____

_____

_____

Answer _____ metres

(2)

(b)   In fact, h_2 is two thirds of h_1

How does this affect the answer to part (a)?
Tick a box.

☐   The ball bounced higher than he expected

☐   The ball bounced lower than he expected

Show working to support your answer.

_____

_____

_____

_____

(2)
(Total 4 marks)

Q3.

£4000 is invested at 1.5% compound interest.

(a) Show that the value of the investment after 2 years is £4120.90

_____

_____

_____

_____

(2)

(b) In the third year the interest rate falls to 1.4%
In the fourth year the interest rate falls to 1.35%

Will the interest for year 4 be more or less than the interest for year 3?
Tick a box.

☐ More   ☐ Less

You **must** show your working.

_____

_____

_____

_____

_____

_____

_____

(4)
(Total 6 marks)

Q4.

Dev invests £1500 for 2 years.
The compound interest rate is 1.6% per year.

(a)   Which calculation works out the total value after 2 years?
Circle your answer.

£1500 × 1.6 × 2   £1500 × 1.6^2

£1500 × 1.016 × 2   £1500 × 1.016^2

(1)

(b)   Emma invests £1500 for 2 years.

The interest rate is
1.8% for the first year
1.3% for the second year.

Whose investment is worth more after 2 years?
You **must** show your working.

_____

_____

_____

_____

_____

Answer _____

(4)
(Total 5 marks)

Q5.

David invests £5000 in a savings account.
The account pays 3.2% compound interest per year.

Work out the value of his investment after 3 years.
Give your answer to the nearest penny.

_____

_____

_____

_____

_____

Answer £ _____

(Total 4 marks)

Q6.

Mirek invests £6000 at a compound interest rate of 1.5% per year.

He wants to earn more than £1000 interest.

Work out the **least** time, in whole years, that this will take.

_____

_____

_____

_____

_____

_____

_____

Answer _____ years

(Total 3 marks)

Q7.

The value of a new car is £18 000
The value of the car decreases by

     25% in the first year

     12% in each of the next 4 years.

Work out the value of the car after 5 years.

_____

_____

_____

_____

_____

_____

_____

Answer £ _____

(Total 3 marks)

Q8.

The value of a second-hand car is £8000
Each year it loses 20% of its value at the start of that year.

Work out its value in 5 years time.

_____

_____

_____

_____

_____

Answer £ _____

(Total 3 marks)

Q9.

Matthew invests some money in a building society.

His money earns 5% compound interest every year.
He wants it to be worth at least £9000 at the end of 3 years.

What is the smallest amount he can invest?

_____

_____

_____

_____

_____

Answer £ _____

(Total 4 marks)

Q10.

£1800 is invested at 4% compound interest per year.

How many years will it take for the investment to be worth £2000?

_____

_____

_____

_____

Answer _____ years

(Total 4 marks)

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Q11.

The pressure at sea level is 101 325 Pascals.

Any rise of 1 km above sea level decreases the pressure by 14%

For example,

at 3 km above sea level the pressure is 14% less than at 2 km

Work out the pressure at 4 km above sea level.

Give your answer to 2 significant figures.

_____

_____

_____

_____

_____

_____

_____

Answer _____ Pascals

(Total 4 marks)

Q12.

The value of a car, £V, after t years, is modelled by the equation

$$V = A \times k^{-t} \quad \text{where } A \text{ and } k \text{ are constants.}$$

The value of the car when new was £22 000
The value of the car after 2 years is £14 080

Work out the values of A and k.

_____

_____

_____

_____

_____

$A =$ _____

$k =$ _____

(Total 4 marks)

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Q13.

The number of bacteria, N, after t hours, of an experiment is given by

$N = A \times 2^{\frac{t}{4}}$ where A is constant.

(a)   At the start of the experiment there are 250 bacteria.

Show that $A = 250$

_____

_____

_____

(1)

(b)   How long is it before the number of bacteria doubles?

_____

_____

_____

Answer _____ hours

(2)

(c)   Megan works out that there will be more than 1 million bacteria after 2 days.

Is she correct?
You **must** show your working.

_____

_____

_____

_____

Answer _____

(2)
(Total 5 marks)