GCSE · Edexcel · Maths

2 hours 46 questions

Exam Questions

Rounding, Estimation & Error Intervals

Rounding to a Given Place Value / Rounding to Significant Figures / Estimation / Error Intervals

Easy (16 questions)	/25
Medium (13 questions)	/31
Hard (17 questions)	/36
Total Marks	**/92**

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Easy Questions

1 A length of string, l cm, has been measured as 4 cm correct to the nearest whole number.

Complete the following statement to show the range of possible values for l.

..... $\leq l <$ .....

(2 marks)

2 Work out an estimate for the value of 67×2.81.
You must show all your working.

(2 marks)

3 Michaela wants to buy 32 books.

Each book costs £4.25.
Michaela does the calculation 30 x 4 = 120 to estimate the cost of the books.

Explain how Michaela's calculation shows the actual cost will be more than £120.

(1 mark)

4 (a) Write 0.3728 correct to 1 decimal place.

(1 mark)

(b) The height, h metres, of a tower is 128m, correct to the nearest metre.
Complete the statement about the value of h.

..... $\leqslant h <$ .....

(2 marks)

5 Write 867 correct to the nearest ten.

(1 mark)

6 The length, l cm, of a pencil is 18cm, correct to the nearest centimetre.

Complete the statement about the value of l.

..... $\leqslant l <$ .....

(2 marks)

7 Write 849.481 correct to 1 decimal place.

(1 mark)

8 Write 97.4236 correct to 3 decimal places.

(1 mark)

9 Write 3.72194 correct to 3 decimal places.

(1 mark)

10 Write 8379 correct to the nearest hundred.

(1 mark)

11 (a) Write 6789 correct to the nearest 100.

(1 mark)

(b) Write 6789 correct to 3 significant figures.

(1 mark)

12 The mass, m kilograms, of a horse is 429kg, correct to the nearest kilogram.

Complete this statement about the value of m.

..... $\leqslant m <$ .....

(2 marks)

13 (a) Write 8473 correct to the nearest ten.

(1 mark)

(b) Write 16.086 correct to 2 decimal places.

(1 mark)

14 Write 3.058 correct to 3 significant figures.

(1 mark)

15 Genaro measures the length, l cm, of his desk as 120 cm, correct to the nearest centimetre.

Complete the statement about the value of l.

..... $\leqslant l <$ .....

(2 marks)

16 Round 78.296 to 1 decimal place.

(1 mark)

Medium Questions

1 A number x is rounded to 2 significant figures.
The result is 0.78.

Write down the error interval for x.

(2 marks)

2 Work out an estimate for $\dfrac{320 \times 867}{46}$

(3 marks)

3 (a) A train is travelling at a speed of 124 miles per hour.

Work out an estimate for the number of seconds that the train takes to travel 1 mile.

(3 marks)

(b) Is your answer to part (a) and overestimate or an underestimate? Give a reason for your answer.

(1 mark)

4 By writing each number correct to 1 significant figure, estimate the value of

$$\frac{37.8 \times 13.2}{28.5 + 22.1}$$

You must show all your working.

(2 marks)

5 The height, h metres, of a tower is 76.3 m, correct to 1 decimal place.
Complete this statement about the value of h.

..... $\leqslant h <$ .....

(2 marks)

6 By rounding each number correct to 1 significant figure, estimate the value of

$$\frac{71 \times 32.4}{4.8^2}$$

You must show all your working.

(2 marks)

7 Calculate $\sqrt[3]{40}$

Give your answer correct to 4 decimal places

(2 marks)

8 By rounding each number correct to 1 significant figure, show that an estimate for this calculation is 20.

$$\frac{9.78 + 31.562}{0.381 \times 5.09}$$

(2 marks)

9 Write 0.047883 correct to 2 significant figures.

(1 mark)

10 Write 6.8167 correct to 3 significant figures.

(1 mark)

11 (a) The amount of fuel, t litres, in a boat's fuel tank is 135 litres, correct to the nearest litre.

Complete the statement about the value of t.

..... $\leqslant t <$ .....

(2 marks)

(b) Marco watched 25 boats enter a port, of which 9 had a mast. There are a total of 200 boats in the port.

Calculate an estimate of the number of boats in the port that have a mast.

(2 marks)

12 Anja is a Type 1 Diabetic.

She must take 1 unit of insulin for **approximately** every 7 grams of carbohydrates she consumes.

If a meal or snack consists of less than 7 grams of carbohydrates, Anja does not take insulin for it.

Here is a day from Anja's food journal.

Meal	What I Ate	Carbs	Units of Insulin
Breakfast	Toast Orange Juice	26g 36g	
Snack 1	Cheese and Olives	2g	
Lunch	Chicken Sandwich	50g	
Snack 2	Rice Cakes	12g	
Dinner	Lasagne	38g	

Complete the table above by **estimating** how many units of insulin is required with each meal.

(4 marks)

13 Hiyam used her calculator to work out a value of a number p.

The answer on her calculator display began with

9.2

Complete the error interval for p.

..... $\leq p <$ .....

(2 marks)

Hard Questions

1 Simone used her calculator to work out the value of a number x.

The answer on her calculator began

11.8

Complete the error interval for x.

(2 marks)

2 Alfie and Bryony use a calculator to work out $\dfrac{385}{9.07^2 - 1.2}$

Alfie's answer is 47.493
Bryony's answer is 4.749

One of these answers is correct.

Use approximations to find out which answer is correct.

(3 marks)

3 (a) Jonah wants to build a tower out of matchsticks.
He wants to build the tower so that it is the same height as the room, which is 394.5 cm high.

Jonah knows that he can increase the height of the tower by 3.8 cm each hour.
He plans to spend 5 hours building the tower each day.

Estimate how many days it will take Jonah to complete his tower.

(3 marks)

(b) Jonah learns a new building technique.
The rate at which he can increase the height of the tower per hour by increases.

How does this affect your answer to part (a)?

(1 mark)

4 $T = \dfrac{49.2 - 9.59}{4.085 \times 2.35}$

By writing each number correct to 1 significant figure, work out an estimate for T.
You must show all your working.

(2 marks)

5 The length, l cm, of a line is 18.3 cm, correct to the nearest millimetre.

Complete this statement about the value of l.

..... $\leqslant l <$ .....

(2 marks)

6 The length, l cm, of a sheet of paper is 29.7 cm, correct to the nearest millimetre.

Complete this statement about the value of l.

..... $\leqslant l <$ .....

(2 marks)

7 The mass, m grams, of a banana is 115 g, correct to the nearest 5 g.

Complete the statement about the value of m.

..... $\leqslant m <$ .....

(2 marks)

8 By rounding each number correct to 1 significant figure, estimate the value of $\sqrt{\dfrac{90006}{10.01^2}}$

You must show all your working.

(2 marks)

9 The amount of water, w litres, in a jug is 1.5 litres, correct to the nearest 0.1 litre.

Complete this statement about the value of w.

..... $\leq w <$ .....

(2 marks)

10 The length, p cm, of a pencil is 9.8cm, correct to 2 significant figures.

Complete the statement about the value of p.

..... $\leqslant p <$ .....

(2 marks)

11 The length of a truck, L metres, is 8.2m, correct to 1 decimal place.
Complete this statement about the value of L.

..... $\leqslant L <$ .....

(2 marks)

12

$$p = \frac{1.6 + 9.6^2}{5.9 - 4.3}$$

By writing each number correct to 1 significant figure, work out an estimate for p.
You must show all your working.

(2 marks)

13 Zach goes on holiday.

The mass, m kilograms, of his suitcase is 23.5 kg, correct to the nearest 500 g.
Complete this statement about the value of m.

..... $\leq m <$ .....

(2 marks)

14 Write 0.046875 correct to 2 significant figures.

(1 mark)

15 Estimate, by rounding each number correct to 1 significant figure,

$$\frac{\sqrt{104.3}}{8.72 - 7.389}$$

You must show all your working.

(2 marks)

16 The width, w metres, of a room is 4.2 metres, correct to the nearest 10 centimetres.

Complete this statement about the value of w.

..... $\leqslant w <$ .....

(2 marks)

17 The length, l metres, of a garden is 78.5 metres, correct to the nearest half metre.

Complete this statement about the value of l.

..... $\leqslant l <$ .....

(2 marks)