



1

Katie says

$$6.2 \times 48.9 = 3031.8$$

Without working out the exact answer, explain how you can tell that Katie's answer must be wrong.

(1 mark)

Round each number to 1 significant figure: 6.2 is about 6 and 48.9 is about 50

$$6 \times 50 = 300, \text{ so the true answer must be close to } 300$$

3031.8 is about ten times bigger than 300, so Katie's answer must be wrong

2

Work out an estimate for the value of

$$\frac{48.7 \times 6.12}{0.216}$$

You must round each number to 1 significant figure.

(3 marks)

Round each number to 1 significant figure: 48.7 becomes 50, 6.12 becomes 6, 0.216 becomes 0.2

Numerator

$$50 \times 6 = 300$$

$$300 \div 0.2 = 3000 \div 2 = 1500$$

1500

3

41,872 fans attend a rugby match.

a. Round 41,872 to the nearest 1000

b. Each fan pays £5 for a match programme.

Use your answer to part (a) to work out an estimate for the total amount paid for programmes.

(3 marks)

a) 41,872 is between 41,000 and 42,000, and 872 is more than 500, so it rounds up to 42,000

$$b) 42,000 \times 5 = 210,000, \text{ so the estimate is } 210,000 \text{ pounds}$$

4

a. Work out an estimate for 62.3×4.87

b. You are given that $623 \times 487 = 303,401$

Use this fact to write down the exact value of 62.3×4.87

(3 marks)

a) Round to 1 significant figure

$$62.3 \text{ is about } 60 \text{ and } 4.87 \text{ is about } 5, \text{ so the estimate is } 60 \times 5 = 300$$

$$b) 62.3 \text{ is } 623 \div 10 \text{ and } 4.87 \text{ is } 487 \div 100, \text{ so the answer is } 303,401 \div 1000 = 303.401$$

b) Check against the estimate: 303.401 is close to 300, so the decimal point is in the right place

- 5 Marco is building a fence.
He buys 28 fence panels costing £19.75 each.
He also buys a tin of paint costing £41.80
By rounding each number to 1 significant figure, work out an estimate for the total amount Marco pays. (4 marks)

Round each number to 1 significant figure: 28 becomes 30, 19.75 becomes 20, 41.80 becomes 40

Estimate for the panels

$$30 \times 20 = 600 \text{ pounds}$$

Add the paint

$$600 + 40 = 640 \text{ pounds}$$

£640

- 6 A lorry driver has to drive 289 miles from Leeds to Plymouth.
Her average speed for the journey is 48 miles per hour.
Work out an estimate for the time the journey takes.
Round both numbers to 1 significant figure before calculating. (4 marks)

Round each number to 1 significant figure: 289 becomes 300 and 48 becomes 50

$$\text{Time} = \text{distance} / \text{speed} = 300 / 50$$

$$300 / 50 = 6, \text{ so the journey takes about 6 hours}$$

6 hours

- 7 Amara drives 189 km at an average speed of 62 km/h.
a. By rounding both numbers to 1 significant figure, work out an estimate for the time her journey takes.
Give your answer in hours and minutes.
b. Is your answer to part (a) an underestimate or an overestimate of the actual time?
Give a reason for your answer. (4 marks)

a) Round to 1 significant figure: 189 becomes 200 and 62 becomes 60

$$\text{a) Time} = 200 / 60 = 3\frac{1}{3} \text{ hours} = 3 \text{ hours } 20 \text{ minutes}$$

b) Rounding the distance up gives more distance to cover, and rounding the speed down means covering it more slowly - both make the estimate bigger, so it is an overestimate

- 8 Dan is walking a long-distance path that is 990 km long.
He walks at an average speed of 4.8 km/h for 8 hours each day.
By rounding each number to 1 significant figure, work out an estimate for the number of days Dan takes to walk the whole path. (4 marks)

Round to 1 significant figure: 990 becomes 1000 and 4.8 becomes 5

Distance walked each day

$$5 \times 8 = 40 \text{ km}$$

Number of days

$$1000 / 40 = 25 \text{ days}$$

25 days

9

A rectangular floor is 4.2 m long and 3.1 m wide.

Flooring costs £24.60 per square metre.

- By rounding each number to 1 significant figure, work out an estimate for the cost of flooring for the whole floor.
- Is your answer to part (a) an underestimate or an overestimate of the actual cost?

Give a reason for your answer.

(4 marks)

a) Round to 1 significant figure: 4.2 becomes 4, 3.1 becomes 3, 24.60 becomes 20

a) Estimated area

$$4 \times 3 = 12 \text{ square metres}$$

a) Estimated cost

$$12 \times 20 = 240 \text{ pounds}$$

b) 4.2, 3.1 and 24.60 were all rounded down, so the estimate is smaller than the actual cost - it is an underestimate

10

A square field has an area of 7900 m²

Work out an estimate for the length of one side of the field.

You must show your working and explain how you know your estimate is sensible.

(4 marks)

The side length of a square is the square root of its area, so we need the square root of 7900

80 squared = 6400 and 90 squared = 8100, so the side is between 80 m and 90 m

7900 is much closer to 8100 than to 6400, so the side is close to 90 m

Try 89

89 squared = 7921, which is very close to 7900, so about 89 m is a sensible estimate

11

- a. Work out an estimate for the value of $\frac{9.72 \times 5.3}{0.48}$
- b. Given that $1.8^4 = 10.4976$, write down the value of 18^4
- c. Write down the value of 5^{-2}

(4 marks)

a) Round to 1 significant figure

9.72 becomes 10, 5.3 becomes 5, 0.48 becomes 0.5. Then $(10 \times 5) / 0.5 = 50 /$

0.5 =

100

b) $18 = 1.8 \times$

10, so

$18^4 =$

$1.8^4 \times$

$10^4 =$

10.4976

$\times$

10,000

=

104,976

c) $5^{-2} = 1 / 5^2$

$= \frac{1}{25}$

12

One evening a theatre sells 412 adult tickets and 243 child tickets.

An adult ticket costs £11.75

A child ticket costs £5.20

- a. By rounding each number to 1 significant figure, work out an estimate for the total amount of money the theatre takes from ticket sales.
- b. Is your answer to part (a) an underestimate or an overestimate of the actual amount?
Give a reason for your answer.

(6 marks)

a) Round to 1 significant figure: 412 becomes 400, 11.75 becomes 10, 243 becomes 200, 5.20 becomes 5

a) Adult tickets

$400 \times 10 = 4000$ pounds. Child tickets: $200 \times 5 = 1000$ pounds

a) Total estimate

$4000 + 1000 = 5000$ pounds

b) All four numbers were rounded down, so the estimate is smaller than the actual takings - it is an underestimate

13

- a. Write the number 4738 correct to 2 significant figures.
b. Write the number 0.05372 correct to 2 significant figures.

(2 marks)

Significant figures start at the first non-zero digit. Keep the requested number of digits and inspect the next digit to decide whether to round up. Leading zeros locate the decimal point; they do not count as significant figures

a) The first two significant figures are 4 and 7; the next digit is 3, so round down: 4700

b) The first two significant figures are 5 and 3; the next digit is 7, so round up: 0.054