C2

Accuracy

CHAPTER ASSIGNMENT · 81 MARKS

Name _____ Class _____ No. _____ Date _____

> Answer every question in the space given. Use a calculator only where a question allows it. Show your working, and write your bounds as inequalities where asked.

Practice questions from *Cambridge IGCSE Mathematics Core and Extended* (4th edition), Chapter 2 (Accuracy), for classroom use. Questions that used a diagram in the book describe it in words. The Check yourself and Chapter quiz questions are Guru Jazzy's own.

Exercise 2.1 · Rounding

2.1 Round each number as shown.

Nearest 1000	Answer	Nearest 100	Answer	Nearest 10	Answer
68 786		78 540		485	
74 245		6858		692	
89 000		14 099		8847	
4020		8084		83	
99 500		950		4	
999 999		2984		997	

Exercise 2.2 · Decimal places

2.2 Give each number to the number of decimal places shown.

To 1 d.p.	Answer	To 1 d.p.	Answer	To 2 d.p.	Answer	To 2 d.p.	Answer
5.58		15.045		6.473		9.3048	
0.73		2.95		9.587		99.996	
11.86		0.98		16.476		0.0048	
157.39		12.049		0.088		3.0037	
4.04		—	—	0.014		—	—

Exercise 2.3 · Significant figures

2.3 Write each number to the number of significant figures in brackets.

Number	Answer	Number	Answer	Number	Answer
48 599 (1 s.f.)		2.5728 (3 s.f.)		0.954 (1 s.f.)	
48 599 (3 s.f.)		990 (1 s.f.)		0.954 (2 s.f.)	
6841 (1 s.f.)		2045 (2 s.f.)		0.003 05 (1 s.f.)	
7538 (2 s.f.)		14.952 (3 s.f.)		0.003 05 (2 s.f.)	
483.7 (1 s.f.)		0.085 62 (1 s.f.)		0.009 73 (2 s.f.)	
0.5932 (1 s.f.)		0.942 (2 s.f.)		0.009 73 (1 s.f.)	

Exercise 2.4 · Appropriate accuracy and estimating

2.4.1 Calculate, giving each answer to an appropriate degree of accuracy. You may use a calculator.

23.456×17.89	0.4×12.62	18×9.24	$76.24 \div 3.2$	7.6^2	16.42^3	$9.2 \div 4^2$

2.4.2 Without a calculator, estimate the answers. Write the rounded numbers you used.

62 × 19	270 × 12	55 × 60	4950 × 28	0.8 × 0.95	0.184 × 475
3946 ÷ 18	8287 ÷ 42	906 ÷ 27	5520 ÷ 13	48 ÷ 0.12	610 ÷ 0.22
78.45 + 51.02	168.3 − 87.09	2.93 × 3.14	84.2 ÷ 19.5	$(9.8)^3 \times (2.2)^2$	$\sqrt[3]{78} \times 6$

2.4.5 Using estimation, decide which of these are definitely incorrect. Explain your reasoning for each. **[6]**

(a) 95 × 212 = 20 140

(b) 44 × 17 = 748

(c) 689 × 413 = 28 457

(d) 142 656 ÷ 8 = 17 832

(e) 77.9 × 22.6 = 2512.54

2.4.6 A rectangle measures 17.2 m by 6.2 m. Estimate its area. Do not work out the exact answer. **[2]**

2.4.7 A cuboid measures 10.5 cm by 9 cm by 2.2 cm. Estimate its volume. **[2]**

Exercise 2.5 · Upper and lower bounds (Extended)

2.5.1 Each number is given to the nearest whole number. Give its bounds and write the range as an inequality in x.

Number	Lower bound	Upper bound	Inequality
6			
83			
152			
1000			
100			

2.5.2 Each number is correct to 1 d.p. Give its bounds and the inequality.

Number	Lower bound	Upper bound	Inequality
3.8			
15.6			
1.0			
10.0			
0.3			

2.5.3 Each number is correct to 2 s.f. Give its bounds and the inequality.

Number	Lower bound	Upper bound	Inequality
4.2			
0.84			
420			
5000			
0.045			
25 000			

2.5.4 The mass of a sack of vegetables is 5.4 kg. Draw the bounds on a number line, and write the range of M as an inequality. [3]

2.5.5 The winning time for a 100 m race was 11.8 seconds. Draw the bounds on a number line, and write the range of T as an inequality. [3]

2.5.6 A swimming pool holds 620 m^3, correct to 2 s.f. Give the bounds of its capacity and write them as an inequality in x. [2]

2.5.7 A field measures 630 m by 400 m, each to the nearest 10 m. Give the bounds of the length, and write the range of the width W as an inequality. [3]

Exercises 2.6 and 2.7 · Calculating with bounds (Extended)

2.6.1 Each number is given to the nearest whole number. Give the lower and upper bounds of each calculation.

Calculation	Lower bound	Upper bound
14 × 20		
135 × 25		
40 ÷ 10		
33 ÷ 11		
1000 ÷ (3 + 8)		

2.6.2 Each number is given to 1 d.p. Give the lower and upper bounds of each calculation.

Calculation	Lower bound	Upper bound
2.1 + 4.7		
6.3 × 4.8		
17.6 − 4.2		
(7.7 − 6.2) ÷ 3.5		

2.7.1 The masses of two parcels, to the nearest 0.5 kg, are 1.5 kg and 2.5 kg. Find the bounds of their combined mass. **[2]**

2.7.2 A rectangle measures 6.8 cm by 4.2 cm, correct to 1 d.p. Find the bounds of its perimeter. **[2]**

2.7.4 A rectangle measures 10.0 cm by 7.5 cm, correct to 1 d.p. Find the bounds of its area. **[2]**

2.7.6 A rectangle has area 55.8 cm^2 and width 4.2 cm, both to 1 d.p. Find the bounds of its length x. **[3]**

2.7.8 A circle has radius 8.5 cm, to 1 d.p. Find the bounds of (a) its circumference and (b) its area. **[4]**

2.7.10 A cube of side 2 cm (to the nearest mm) has a mass of 100 g (to the nearest gram). Find the greatest and least possible density. Density = mass ÷ volume. **[4]**

2.7.11 The Earth–Moon distance is 400 000 km to the nearest 100 000 km. A rocket's average speed is 3500 km/h to the nearest 500 km/h. Find the greatest and least time it could take to reach the Moon. **[4]**

Student assessment

A1 Round 2841 to the nearest 100, 7286 to the nearest 10, 48 756 to the nearest 1000, and 951 to the nearest 100. **[4]**

A2 Round 3.84 (1 d.p.), 6.792 (1 d.p.), 0.8526 (2 d.p.), 1.5849 (2 d.p.), 9.954 (1 d.p.) and 0.0077 (3 d.p.). **[6]**

A3 Round 3.84 (1 s.f.), 6.792 (2 s.f.), 0.7765 (1 s.f.), 9.624 (1 s.f.), 834.97 (2 s.f.) and 0.004 51 (1 s.f.). [6]

A4 1 mile is 1760 yards. Estimate the number of yards in 11.5 miles. [2]

A5 A cuboid measures 12.32 cm by 1.8 cm by 4.16 cm. Calculate its volume to an appropriate degree of accuracy. [2]

A6 A playing field is 350 m by 200 m, each to the nearest metre. Write the ranges of the length and the width as inequalities. [2]

A7 Five boys have masses, to the nearest 10 kg, of 40 kg, 50 kg, 50 kg, 60 kg and 80 kg. Find the least possible total mass. [2]

A8 A water tank measures 30 cm by 50 cm by 20 cm, each to the nearest centimetre. Find its largest possible volume. [2]

A9 A tank holds 6000 cm^3 (1 s.f.). A full cup holds 300 cm^3 (2 s.f.). Find the greatest number of full cups that could be drawn from the tank. [3]

Check yourself

1 Explain, with an example, the difference between rounding to 2 decimal places and to 2 significant figures. [2]

2 Why is 48 599 to 3 s.f. written as 48 600 and not 486? [1]

3 A student says 0.0705 has 4 significant figures. Are they right? Explain. [2]

4 A length is 7.0 m to 1 d.p. Give the bounds, and explain why the upper bound uses $<$ and not $\leq$. [3]

5 Write the rule for the greatest possible value of a ÷ b when a and b are both rounded. Explain why it works. [2]

Chapter quiz

Q1 What is 28 617 rounded to the nearest 1000?

A	B	C	D
28 000	28 600	29 000	30 000

Q2 What is 5.574 written to 2 decimal places?

A	B	C	D
5.5	5.57	5.58	5.6

Q3 What is 0.0043 written to 1 significant figure?

A	B	C	D
0	0.004	0.0043	0.005

Q4 What is 48 599 written to 3 significant figures?

A	B	C	D
485	486	48 500	48 600

Q5 Which is the best estimate of 6386 ÷ 27?

A	B	C	D
20	200	2000	20 000

Q6 A height is 162 cm to the nearest cm. What is its lower bound?

A	B	C	D
161 cm	161.5 cm	161.9 cm	162.5 cm

Q7 Which inequality shows 4.5 correct to 1 decimal place?

A	B	C	D
$4.4 \leq x < 4.6$	$4.45 \leq x < 4.55$	$4.45 < x \leq 4.55$	$4.49 \leq x \leq 4.51$

Q8 a and b are rounded. Which gives the largest possible value of a − b?

A	B	C	D
UB of a − UB of b	UB of a − LB of b	LB of a − UB of b	LB of a − LB of b

End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/o-level-mathematics/chapter-2-accuracy/