

# Rounding

## Solutions

For Pearson Edexcel GCSE Mathematics (1MA1) • Foundation tier

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Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

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**1** (2 marks)

(a) Write 38 652 correct to the nearest 10

38 652 is between 38 650 and 38 660.

Look at the units digit: it is 2.

2 is less than 5, so round down.

**Answer:** 38 650

(b) Write 38 652 correct to the nearest 1000

38 652 is between 38 000 and 39 000.

Look at the hundreds digit: it is 6.

6 is 5 or more, so round up.

**Answer:** 39 000

**Tip:** Rounding to the nearest 1000 means the answer ends in three zeros. 38 700 (nearest 100) and 40 000 (nearest 10 000) are common wrong answers.

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**2** (4 marks)

(a) Write 3470 correct to 2 significant figures.

Keep 2 significant figures: 34 | 70

The next digit is 7, so round the 4 up to 5.

Fill the rest with zeros to keep the number the same size.

**Answer:** 3500

**Tip:** 3470 to 2 s.f. is 3500, not 35. Your answer must be about the same size as the original number.

- (b) Write 0.04571 correct to 1 significant figure.

Zeros at the start do not count as significant figures.

The first significant figure is the 4.

The next digit is 5, so round up: 0.04 becomes 0.05.

**Answer:** 0.05

- (c) Write 18.965 correct to 1 decimal place.

Keep 1 digit after the decimal point: 18.9|65

The next digit is 6, so round up.

18.9 goes up to 19.0.

**Answer:** 19.0

- (d) Write 6.0047 correct to 3 decimal places.

Keep 3 digits after the decimal point: 6.004|7

The next digit is 7, so round up.

6.004 becomes 6.005.

**Answer:** 6.005

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**3** (1 mark)

Round 0.098 52 to 2 significant figures.

The first significant figure is the 9.

Keep 2 significant figures: 0.098|52

The next digit is 5, so round up.

0.098 becomes 0.099.

**Answer:** 0.099

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**4** (1 mark)

There are 1287 students at a school.

Nia says there are 1300 students to the nearest 10

Explain Nia's mistake.

1287 is between 1280 and 1290.

The units digit is 7, so round up to 1290.

1300 is 1287 rounded to the nearest 100, not the nearest 10.

**Answer:** It should be 1290 (1300 is to the nearest 100)

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**5** (3 marks)

- (a) Use your calculator to work out  $\frac{21.6 + 3.54}{1.2^2}$   
Write down all the figures on your calculator display.

Top:  $21.6 + 3.54 = 25.14$

Bottom:  $1.2^2 = 1.44$

Divide:  $25.14 \div 1.44 = 17.458333 \dots$

**Answer:** 17.458333...

**Tip:** Work out the top and the bottom first, or use the fraction button. Typing  $21.6 + 3.54 \div 1.2^2$  divides only the 3.54.

*Marks:* 1 mark for 25.14 or 1.44. 1 mark for 17.458333...

- (b) Write your answer to part (a) correct to 2 significant figures.

Keep 2 significant figures: 17|.458 ...

The next digit is 4, so round down.

**Answer:** 17

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**6** (2 marks)

A box of 40 pens costs £3.49

Work out the cost of one pen, in pence.

Give your answer to the nearest penny.

Change £3.49 to pence: 349p.

Divide by the number of pens:  $349 \div 40 = 8.725$

To the nearest penny (whole number): 8.725 rounds up to 9.

**Answer:** 9p

*Marks:* 1 mark for  $349 \div 40$  (or  $3.49 \div 40$ ). 1 mark for 9p.

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**7** (2 marks)

Work out the circumference of a circle of diameter 9.4 cm.

Give your answer correct to 3 significant figures.

Circumference =  $\pi \times$  diameter

$\pi \times 9.4 = 29.530 \dots$

To 3 significant figures: 29.5|30 ...

The next digit is 3, so round down to 29.5.

**Answer:** 29.5 cm

**Tip:** 3 significant figures is not the same as 3 decimal places. 29.530 is wrong.

*Marks:* 1 mark for  $\pi \times 9.4$ . 1 mark for 29.5.

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**8** (2 marks)

Hana has £40

Cinema tickets cost £6.85 each.

Work out the greatest number of cinema tickets Hana can buy.

$$40 \div 6.85 = 5.839 \dots$$

Check 6 tickets:  $6 \times 6.85 = 41.10$ , which is more than £40.

Check 5 tickets:  $5 \times 6.85 = 34.25$ , which she can afford.

She cannot buy part of a ticket, so round **down**.

**Answer:** 5

**Tip:** 5.839 would normally round to 6, but Hana cannot afford 6 tickets. Think about the real situation.

**Marks:** 1 mark for  $40 \div 6.85$ , or for working out  $6.85 \times 5$  and  $6.85 \times 6$ . 1 mark for 5.

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**9** (2 marks)

Jake was asked to write 7.3449 correct to 1 decimal place.

Here is his working.

$$7.3449 \rightarrow 7.345 \rightarrow 7.35 \rightarrow 7.4$$

- (a) Explain what Jake has done wrong.

Jake rounded in stages, rounding numbers he had already rounded.

To round to 1 decimal place you only look at the second decimal place of the **original** number.

In 7.3449 the second decimal place is 4, so the answer should round down.

**Answer:** He rounded in stages; he should look only at the 4 in the second decimal place of 7.3449

**Tip:** Never round an answer that has already been rounded. Go straight from the original number to the accuracy asked for.

- (b) Write 7.3449 correct to 1 decimal place.

Keep 1 digit after the decimal point: 7.3|449

The next digit is 4, so round down.

**Answer:** 7.3

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**10** (2 marks)

A museum had 4700 visitors on Saturday, correct to the nearest hundred.

- (a) Write down the least possible number of visitors on Saturday.

Halfway between 4600 and 4700 is 4650.

4650 rounds up to 4700.

4649 would round down to 4600.

**Answer:** 4650

- (b) On Sunday, the museum also had 4700 visitors, correct to the nearest hundred. Work out the greatest possible difference between the number of visitors on Saturday and the number of visitors on Sunday.

The least possible number on either day is 4650.

The greatest possible number on either day is 4749 (4750 would round up to 4800).

The difference is greatest when one day has 4749 and the other has 4650.

$$4749 - 4650 = 99$$

**Answer:** 99

**Tip:** The two days can have different numbers of visitors even though they both round to 4700. Use the greatest value for one day and the least value for the other.

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**11** (2 marks)

Ffion thinks of two whole numbers.

She rounds the first number to the nearest 10 and gets 40

She rounds the second number to the nearest 100 and gets 300

Work out the greatest possible difference between Ffion's two numbers.

The first number rounds to 40 (nearest 10), so it is one of 35, 36, ..., 44.

The second number rounds to 300 (nearest 100), so it is one of 250, 251, ..., 349.

For the greatest difference, use the largest second number and the smallest first number.

$$349 - 35 = 314$$

**Answer:** 314

**Tip:** The numbers are whole numbers, so the largest number that rounds to 300 is 349, not 350.

*Marks:* 1 mark for 35 or 349 (or 350) seen. 1 mark for 314.

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