

Using a Calculator

Solutions

For AQA GCSE Mathematics (8300) • Foundation tier

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.

1 (2 marks)

- (a) Use your calculator to work out $\frac{\sqrt{130} + 9.6}{0.75}$
Give your answer as a decimal.
Write down your full calculator display.

Work out the top first:

$$\sqrt{130} = 11.40175425 \dots$$

$$11.40175425 \dots + 9.6 = 21.00175425 \dots$$

$$\text{Then divide by the bottom: } 21.00175425 \dots \div 0.75 = 28.002339$$

Answer: 28.002339

- (b) Give your answer to part (a) to 1 decimal place.

$$28.0 \mid 02 \dots$$

The next digit is 0, so round down.

Keep the 0 after the decimal point: the answer is 28.0, not 28.

Answer: 28.0

Tip: To 1 decimal place means one digit after the decimal point, even when it is a zero. Writing 28 does not show 1 decimal place.

2 (2 marks)

- (a) Use your calculator to work out $\sqrt{47.3 - 2.8^2}$
Write down your full calculator display.

The square root covers the whole of $47.3 - 2.8^2$.

$$2.8^2 = 7.84$$

$$47.3 - 7.84 = 39.46$$

$$\sqrt{39.46} = 6.281719510 \dots$$

Answer: 6.28171951...

Tip: Make sure the square root covers everything under the root sign. Work out $47.3 - 2.8^2$ first, then square root it.

- (b) Give your answer to part (a) to 3 significant figures.

$$6.2817 \dots$$

The next digit is 1, so round down.

Answer: 6.28

3 (1 mark)

Circle the value of 4.2^3

Options: 12.6, 17.64, 64, 74.088

4.2^3 means $4.2 \times 4.2 \times 4.2$.

$$4.2 \times 4.2 \times 4.2 = 74.088$$

Answer: 74.088

4 (1 mark)

Work out the reciprocal of 0.16

The reciprocal of a number is 1 divided by the number.

$$1 \div 0.16 = 6.25$$

Answer: 6.25

5 (2 marks)

- (a) Rob uses his calculator to work out the total cost, in pounds, of some food.

The display shows

Write this as an amount of money.

0.8 of a pound is 80p.

Money is written with two decimal places.

Answer: £13.80

- (b) Kim uses her calculator to work out the time, in hours, for a journey.

The display shows

Write this time in hours and minutes.

3.4 hours is 3 hours and 0.4 of an hour.

There are 60 minutes in an hour.

$$0.4 \times 60 = 24 \text{ minutes}$$

Answer: 3 hours 24 minutes

Tip: 3.4 hours is **not** 3 hours 4 minutes or 3 hours 40 minutes. Multiply the decimal part by 60.

6 (2 marks)

Leo wants to work out $\frac{18.6 + 7.4}{4}$

He types and gets 20.45

- (a) Explain the mistake Leo has made.

A calculator divides before it adds.

So it worked out $7.4 \div 4$ first, and then added 18.6.

Leo needed brackets around $18.6 + 7.4$, or to press = before dividing.

Answer: He did not use brackets, so only 7.4 was divided by 4

(b) Work out the correct answer.

$$(18.6 + 7.4) \div 4$$

$$= 26 \div 4$$

$$= 6.5$$

Answer: 6.5

7 (2 marks)

Work out $\frac{(2.3 + 1.8)^3}{5.6 - 2.35}$
Give your answer to 2 decimal places.

Top: $2.3 + 1.8 = 4.1$

$$4.1^3 = 68.921$$

Bottom: $5.6 - 2.35 = 3.25$

Divide: $68.921 \div 3.25 = 21.20646 \dots$

To 2 decimal places: 21.20 | 646 ... rounds up to 21.21

Answer: 21.21

Tip: Work out the top and the bottom separately, then divide. If you type it all in one go, use brackets or the fraction button.

Marks: 1 mark for 21.206... or 68.921 or 3.25. 1 mark for 21.21.

8 (2 marks)

Work out $\sqrt[3]{9.2} \times 1.6^2$

Write down your full calculator display.

$$\sqrt[3]{9.2} = 2.09537 \dots$$

$$1.6^2 = 2.56$$

$$2.09537... \times 2.56 = 5.364170512...$$

Answer: 5.364170512...

Marks: 1 mark for 2.095... or 2.56. 1 mark for the full display 5.364170512...

9 (1 mark)

Use your calculator to work out $\frac{5}{8} + \frac{7}{12}$
Give your answer as a mixed number.

Use the fraction button on your calculator.

Or by hand: the common denominator is 24.

$$\frac{15}{24} + \frac{14}{24} = \frac{29}{24}$$

$$29 \div 24 = 1 \text{ remainder } 5, \text{ so } \frac{29}{24} = 1\frac{5}{24}$$

Answer: $1\frac{5}{24}$

Tip: Most calculators have a key to change $\frac{29}{24}$ into a mixed number. Do not give a decimal when a mixed number is asked for.

10 (1 mark)

Ben says,

‘ $\sqrt{16 + 9}$ gives the same answer as $\sqrt{16} + \sqrt{9}$ ’

Is Ben correct? Tick a box.

Show how you decide.

$$\sqrt{16 + 9} = \sqrt{25} = 5$$

$$\sqrt{16} + \sqrt{9} = 4 + 3 = 7$$

5 is not equal to 7, so Ben is wrong.

Answer: No: 5 is not equal to 7

11 (2 marks)

Mia says,

‘ $\frac{17}{12}$ is closer to $\sqrt{2}$ than 1.4 is.’

Is Mia correct? Tick a box.

You must show your working.

$$\sqrt{2} = 1.414213562 \dots$$

$$\frac{17}{12} = 1.416666666 \dots$$

$$\text{Distance from } \frac{17}{12} \text{ to } \sqrt{2}: 1.416666 \dots - 1.414213 \dots = 0.00245 \dots$$

$$\text{Distance from } 1.4 \text{ to } \sqrt{2}: 1.414213 \dots - 1.4 = 0.01421 \dots$$

0.00245 ... is smaller than 0.01421 ...

So $\frac{17}{12}$ is closer to $\sqrt{2}$, and Mia is correct.

Answer: Yes: $\frac{17}{12}$ is about 0.0025 from $\sqrt{2}$, but 1.4 is about 0.014 away

Tip: Write down enough decimal places to see the difference. Rounded to 2 decimal places, $\sqrt{2}$ and $\frac{17}{12}$ both look like 1.41 or 1.42, which does not show anything.

Marks: 1 mark for 1.4142... and 1.4166... (or both differences). 1 mark for Yes with both differences compared.

12 (5 marks)

(a) Estimate the value of $\frac{58.4 \times 2.95}{4.1^2 - 6.8}$

Round each number to 1 significant figure.

You must show your working.

Round each number to 1 significant figure:

$$58.4 \approx 60, 2.95 \approx 3, 4.1 \approx 4, 6.8 \approx 7$$

Top: $60 \times 3 = 180$

Bottom: $4^2 - 7 = 16 - 7 = 9$

$180 \div 9 = 20$

Answer: 20

Tip: Round the numbers first, then do the working. 2.95 to 1 significant figure is 3, not 2.

Marks: 1 mark for rounding at least three of the numbers correctly. 1 mark for 20.

- (b) Owen uses his calculator to work out the exact value.

His calculator shows 3.448661511

Use your answer to part (a) to explain why Owen must have made a mistake.

The estimate is 20.

3.4 ... is much smaller than 20, so it cannot be right.

(Owen divided by 4.1^2 and then took away 6.8: he did not put brackets around the bottom.)

Answer: The estimate is 20, and 3.45 is nowhere near 20

- (c) Work out the value of $\frac{58.4 \times 2.95}{4.1^2 - 6.8}$

Give your answer to 1 decimal place.

Top: $58.4 \times 2.95 = 172.28$

Bottom: $4.1^2 - 6.8 = 16.81 - 6.8 = 10.01$

Divide: $172.28 \div 10.01 = 17.21078921 \dots$

To 1 decimal place: 17.2|1... rounds to 17.2

This is close to the estimate of 20 ✓

Answer: 17.2

Tip: Work out the bottom as one number before you divide, or put brackets around it: $(4.1^2 - 6.8)$.

Marks: 1 mark for 17.21..., 172.28 or 10.01. 1 mark for 17.2.