



THIRD SPACE
LEARNING

Diagnostic Questions

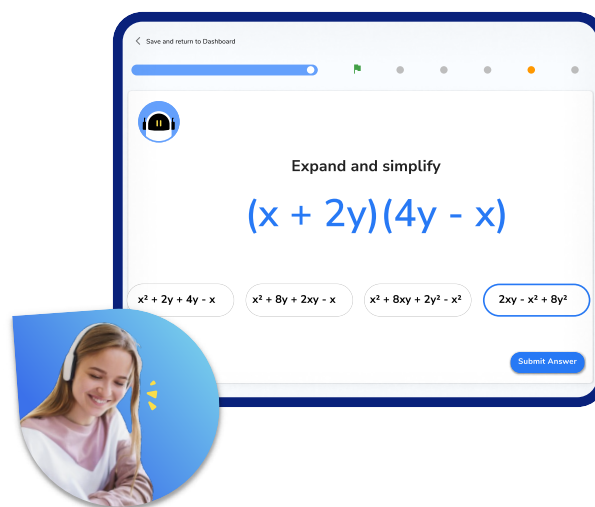
Rounding & Estimation | Number

This resource in a nutshell

Diagnostic questions are a quick and easy way of assessing your students' knowledge and understanding of a particular topic.

Students may be struggling with **Rounding & Estimation** for a number of different reasons. Diagnostic questions can help to identify the particular misconception that the student has and help to determine the specific support they will need in order to improve.

They are low stakes and support students developing metacognition around how their learning is progressing and what they need to do to improve further.



At Third Space Learning, we use diagnostic questions before and after online tutoring sessions to identify gaps and track progress, an example of this is shown above.

How to use the questions in this resource

There are 20 multiple choice questions, each designed to assess each of the key skills required to master **rounding & estimation**. Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Rounding beyond one place value**, **Truncation**, **Rounding too early**, **Rounding to 1 significant figure**.

When answering these questions, students should be **encouraged to explain why they have chosen a particular answer**, and why the other three answers are incorrect. This can be done verbally in small groups, or written down on the worksheet or in their books.

This resource has been designed to be as **flexible** as possible with questions that can be easily chopped up and reordered, and come with a separate answer sheet that details all of the misconceptions highlighted in the answers.

Diagnostic Questions: Rounding & Estimation

1. Round to the nearest ten:

279

A) 270	B) 80
C) 280	D) 300

2. Round to the nearest hundred:

27448

A) 27500	B) 27450
C) 400	D) 27400

3. Round to the nearest integer:

47.501

A) 50	B) 47
C) 48	D) 47.5

Diagnostic Questions: Rounding & Estimation

4. Round to the nearest thousand:

36449

A) 36400	B) 40000
C) 37000	D) 36000

5. Truncate to the hundreds:

80376

A) 80300	B) 80400
C) 80370	D) 376

6. Round to the nearest hundredth:

2.71828

A) 3	B) 2.72
C) 2.71	D) 2.718

Diagnostic Questions: Rounding & Estimation

7. Round to one significant figure:

749583

A) 7	B) 700000
C) 750000	D) 70000

8. Round to two significant figures:

0.0092741

A) 0.0	B) 93
C) 0.0092	D) 0.0093

9. Truncate to the tenths:

24.5833

A) 24.6	B) 0.0833
C) 24.5	D) 24.58

Diagnostic Questions: Rounding & Estimation

10. A number, n , is rounded to the nearest integer.

Find the lowest value n could have taken if the answer is:

17

A) 16.9	B) 20
C) 16.5	D) 17.5

11. Give the option that is a reasonable estimate for:

$\sqrt{56}$

A) 7.5	B) $2\sqrt{14}$
C) 8	D) 7.2

12. By first rounding each term to the nearest hundred, estimate:

$10306 + 2863 + 3471$

A) 16500	B) 16700
C) 16600	D) 16000

Diagnostic Questions: Rounding & Estimation

13. By first rounding each term to the nearest integer, estimate:

$$\frac{8.4 \times 11.7}{6.42}$$

A) 15	B) 14.6
C) 16	D) 10

14. By first rounding each term to the nearest ten, estimate:

$$415 \div 64$$

A) 6	B) 6.4
C) 10	D) 7

15. By first rounding each term to one significant figure, estimate:

$$0.0266 - 0.00986 + 0.4375$$

A) 0.5	B) 0.411
C) 0.42	D) 0.44

Diagnostic Questions: Rounding & Estimation

16. By first rounding each term to one significant figure, estimate:

$$63.77 \times 18.2$$

A) 1000	B) 1200
C) 600	D) 1134

17. By first rounding each term to one significant figure, estimate:

$$83.7 - 94.22 \times 0.143$$

A) 70	B) 80
C) -1	D) 71

18. By first rounding each term to one significant figure, estimate:

$$\frac{68.3 \times 17.6}{\sqrt{97.8}}$$

A) 60	B) 14
C) 140	D) 100

Diagnostic Questions: Rounding & Estimation

19. A restaurant had weekly takings of £18328. Altogether, the restaurant accommodated 572 diners. Estimate how much each diner spent at the restaurant.

A) £30	B) £32.04
C) £20	D) £3

20. Use the quadratic formula to estimate (to the nearest tenth) the positive solution of the equation:

$$x^2 - 5x = 2$$

A) $x \approx 0.4$	B) $x \approx -0.4$
C) $x \approx 5.4$	D) $x \approx 5.3$

Diagnostic Questions: Rounding & Estimation Answers

1. Round to the nearest ten:

279

- A) 270 Student truncated to the tens
- B) 80 Student forgot to include the digit from the hundreds
- C) 280 Correct answer
- D) 300 Student rounded to the nearest hundred

2. Round to the nearest hundred:

27448

- A) 27500 Student rounded up
- B) 27450 Student rounded to the nearest ten
- C) 400 Student did not include all digits needed
- D) 27400 Correct answer

3. Round to the nearest integer:

47.501

- A) 50 Student rounded to nearest ten
- B) 47 Student truncated as an integer
- C) 48 Correct answer
- D) 47.5 Student rounded to one decimal place

Diagnostic Questions: Rounding & Estimation Answers

4. Round to the nearest thousand:

36449

- A) 36400 Student rounded to nearest hundred
- B) 40000 Student rounded to nearest ten thousand
- C) 37000 Student rounded in wrong direction
- D) 36000 Correct answer

5. Truncate to the hundreds:

80376

- A) 80300 Correct answer
- B) 80400 Student rounded to the nearest hundred
- C) 80370 Student truncated to the tens
- D) 376 Student wrote down the hundreds, tens and units

6. Round to the nearest hundredth:

2.71828

- A) 3 Student rounded to the nearest integer
- B) 2.72 Correct answer
- C) 2.71 Student truncated to the hundredths
- D) 2.718 Student rounded to the thousandths

Diagnostic Questions: Rounding & Estimation Answers

7. Round to one significant figure:

749583

A) 7 Student stated the digit that is the first significant figure

B) 700000 Correct answer

C) 750000 Rounded to the wrong degree of accuracy

D) 70000 Student's answer is not the correct magnitude

8. Round to two significant figures:

0.0092741

A) 0.0 Student lacks the understanding of what a significant figure is

B) 93 Student ignored the place value of the figures

C) 0.0092 Student truncated to two significant figures

D) 0.0093 Correct answer

9. Truncate to the tenths:

24.5833

A) 24.6 Student rounded to the nearest tenth

B) 0.0833 Student kept the wrong digits as their answer

C) 24.5 Correct answer

D) 24.58 Student truncated to the wrong place value

Diagnostic Questions: Rounding & Estimation Answers

10. A number, n , is rounded to the nearest integer.

Find the lowest value n could have taken if the answer is:

17

- A) 16.9 Student did not consider all values on the number line
- B) 20 Student rounded the answer to the nearest ten
- C) 16.5 Correct answer
- D) 17.5 Student found the greatest value that n could have been

11. Give the option that is a reasonable estimate for:

$\sqrt{56}$

- A) 7.5 Correct answer
- B) $2\sqrt{14}$ Student gave the exact answer
- C) 8 Student calculated the answer and rounded to the nearest integer
- D) 7.2 Student chose an answer between 7 and 8, but did not consider the location of the known square roots

12. By first rounding each term to the nearest hundreds, estimate:

$10306 + 2863 + 3471$

- A) 16500 Student truncated each term to the hundreds
- B) 16700 Correct answer
- C) 16600 Student found the total then rounded to the nearest hundred
- D) 16000 Student rounded each term to the nearest thousand

Diagnostic Questions: Rounding & Estimation Answers

13. By first rounding each term to the nearest integer, estimate:

$$\begin{array}{r} 8.4 \times 11.7 \\ \hline 6.42 \end{array}$$

- A) 15 Student rounded to the nearest integer after calculating
- B) 14.6 Student truncated each term to the integer, then calculated
- C) 16 Correct answer
- D) 10 Student first rounded each number to the nearest ten

14. By first rounding each term to the nearest ten, estimate:

$$415 \div 64$$

- A) 6 Student mistakenly rounded 64 up
- B) 6.4 Student rounded 415 incorrectly, then gave answer to one decimal place
- C) 10 Student worked out exact answer then rounded to nearest ten
- D) 7 Correct answer

15. By first rounding each term to one significant figure, estimate:

$$0.0266 - 0.00986 + 0.4375$$

- A) 0.5 Student worked out exact answer then rounded to one significant figure
- B) 0.411 Student truncated each term to one significant figure then calculated
- C) 0.42 Correct answer
- D) 0.44 Student added the second term, rather than subtracting

Diagnostic Questions: Rounding & Estimation Answers

16. By first rounding each term to one significant figure, estimate:

$$63.77 \times 18.2$$

- A) 1000 Student rounded the exact answer to one significant figure
- B) 1200 Correct answer
- C) 600 Student truncated both numbers to the tens then multiplied
- D) 1134 Student rounded both numbers to the nearest integer then multiplied

17. By first rounding each term to one significant figure, estimate:

$$83.7 - 94.22 \times 0.143$$

- A) 70 Student rounded exact answer to one significant figure
- B) 80 Student rounded 0.143 to zero
- C) -1 Student rounded correctly but did not follow order of operations
- D) 71 Correct answer

18. By first rounding each term to one significant figure, estimate:

$$\frac{68.3 \times 17.6}{\sqrt{97.8}}$$

- A) 60 Student rounded down both numbers in numerator
- B) 14 Student forgot to square root after rounding term in denominator
- C) 140 Correct answer
- D) 100 Student rounded final answer to one significant figure

Diagnostic Questions: Rounding & Estimation Answers

19. A restaurant had weekly takings of £18328. Altogether, the restaurant accommodated 572 diners. Estimate how much each diner spent at the restaurant.

A) £30 Correct answer

B) £32.04 Student calculated the mean spend per diner

C) £20 Student truncated each value to one significant figure before calculating

D) £3 Student missed out a placeholder in one of the numbers

20. Use the quadratic formula to estimate (to the nearest tenth) the positive solution of the equation:

$$x^2 - 5x = 2$$

A) $x \approx 0.4$ Student made a sign error in the leading term of the quadratic formula

B) $x \approx -0.4$ Student obtained the negative solution of the equation

C) $x \approx 5.4$ Correct answer

D) $x \approx 5.3$ Student rounded their final answer incorrectly

Where to go next?

For more diagnostic questions, and GCSE maths revision resources and worksheets to support students in fixing any misconceptions take a look at the free Third Space Learning [GCSE maths revision](#) pages.

Scan the QR code to discover our library of FREE GCSE maths revision resources

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