



THIRD SPACE
LEARNING

Diagnostic Questions

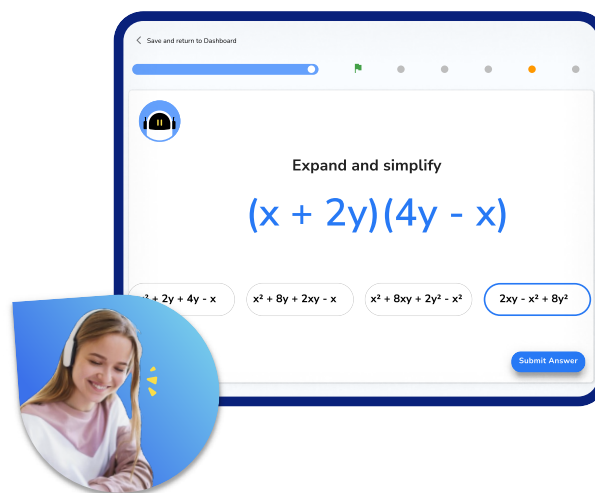
Using a Calculator | Number

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 **using a calculator** 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 15 multiple choice questions, each designed to assess each of the key skills required to master **Surds**. Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Using the shift button with trigonometry**, **Incorrect order of buttons when generating a fraction or a root**, the **Quadratic formula**, and **Order of operations including powers**.

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: Using a Calculator

1. Evaluate, rounding your answer to one decimal place:

$$13.66 \times 27.849$$

A) 380.4	B) 378.1
C) 380417.3	D) 375.5

2. Evaluate, rounding your answer to one decimal place:

$$1.9 \times 3.7^2$$

A) 49.4	B) 14.1
C) 26.0	D) 7.1

3. Use the fraction button on your calculator to evaluate:

$$\frac{3}{13} \times \frac{5}{17} \div \frac{18}{25}$$

A) $\frac{5}{1326}$	B) $\frac{125}{1326}$
C) $\frac{54}{1105}$	D) $\frac{875}{23706}$

Diagnostic Questions: Using a Calculator

4. Evaluate, rounding your answer to one decimal place:

$$(6.73 - 8.102)^4$$

A) - 2257.48	B) - 4302.20
C) - 5.49	D) 3.5

5. Evaluate, giving your full calculator display:

$$\sqrt{5.37 + 8.26}$$

A) 2.319107587	B) 5.191347618
C) 3.691882988	D) 2.388720217

6. Evaluate, giving your answer to two decimal places:

$$2\frac{4}{7} \div \frac{14}{9}$$

A) 1.65	B) 2.20
C) 1.78	D) 1.02

Diagnostic Questions: Using a Calculator

7. Evaluate, giving your answer rounded to two decimal places:

$$\frac{4.83 \times 5.2}{\sqrt{10}}$$

A) 2.51	B) 7.94
C) 1.58	D) 3.17

8. Evaluate, giving your full calculator display:

$$\sqrt[5]{425}$$

A) 20.61552813	B) 85
C) 103.0776406	D) 3.354886145

9. If $r = 6.1$, giving your answer rounded to one decimal place, evaluate:

$$\pi r^2$$

A) 367.2	B) 116.9
C) $\pi 37.2$	D) 38.3

Diagnostic Questions: Using a Calculator

10. Use the quadratic formula to find the positive solution (rounded to 2 decimal places) of:

$$3x^2 - 2x - 4 = 0$$

A) 3.20	B) 4.61
C) 1.54	D) 1.46

11. Evaluate, giving your answer rounded to two decimal places:

$$\frac{\sqrt{5.38 \times 4.7}}{0.61^2}$$

A) 8.24	B) 29.30
C) 13.51	D) 8.22

12. Evaluate, giving your answer rounded to two decimal places:

$$3.7^3 - \frac{\sqrt{7 - 2.1}}{5 - 4.96}$$

A) 4.69	B) -4.69
C) 1210.99	D) 4.73

Diagnostic Questions: Using a Calculator

13. Evaluate, giving your answer rounded to two decimal places:

$$\left(2.8^3 - \sqrt{4.8}\right) \div \frac{3.9^2}{7.1 - 1.06}$$

A) 49.76	B) 8.05
C) 21.08	D) 7.85

14. Evaluate, rounding your answer to two decimal places:

$$\tan(3.8)$$

A) 0.07	B) 0.77
C) 0.06	D) 75.26

15. Evaluate, rounding your answer to one decimal place:

$$\cos^{-1}(0.74)$$

A) 1.0	B) 42.3
C) 0.7	D) 47.0

Diagnostic Questions: Using a Calculator Answers

1. Evaluate, rounding your answer to one decimal place:

$$13.66 \times 27.849$$

A) 380.4 Correct answer

B) 378.1 Student rounded to one decimal place before multiplying

C) 380417.3 Student moved the positions of the decimal points

D) 375.5 Student interchanged the 8 and 4 when inputting

2. Evaluate, rounding your answer to one decimal place:

$$1.9 \times 3.7^2$$

A) 49.4 Student squared the product of 1.9 and 3.7

B) 14.1 Student multiplied by two instead of squaring

C) 26.0 Correct answer

D) 7.1 Student found the product of 1.9 and 3.72

3. Use the fraction button on your calculator to evaluate:

$$\frac{3}{13} \times \frac{5}{17} \div \frac{18}{25}$$

A) $\frac{5}{1326}$ Student incorrectly cancelled before using their calculator

B) $\frac{125}{1326}$ Correct answer

C) $\frac{54}{1105}$ Student used multiplication instead of division

D) $\frac{875}{23706}$ Student concatenated the first two fractions instead of multiplying

Diagnostic Questions: Using a Calculator Answers

4. Evaluate, rounding your answer to one decimal place:

$$(6.73 - 8.102)^4$$

- A) - 2257.48 Student exponentiated both numbers separately
- B) - 4302.20 Student did not include the brackets
- C) - 5.49 Student confused exponentiation with multiplication
- D) 3.5 Correct answer

5. Evaluate, giving your full calculator display:

$$\sqrt{5.37 + 8.26}$$

- A) 2.319107587 Student missed the plus sign; square rooted 5.37826
- B) 5.191347618 Student typed a sum of two square roots
- C) 3.691882988 Correct answer
- D) 2.388720217 Student selected cube root function on calculator

6. Evaluate, giving your answer to two decimal places:

$$2\frac{4}{7} \div \frac{14}{9}$$

- A) 1.65 Correct answer
- B) 2.20 Student typed the 2 into the numerator of the first fraction
- C) 1.78 Student typed the second fraction as a mixed number $1\frac{4}{9}$
- D) 1.02 Student typed subtract instead of divide

Diagnostic Questions: Using a Calculator Answers

7. Evaluate, giving your answer rounded to two decimal places:

$$\frac{4.83 \times 5.2}{\sqrt{10}}$$

A) 2.51 Student forgot to square root the denominator

B) 7.94 Correct answer

C) 1.58 Student square rooted the entire fraction

D) 3.17 Student typed a plus sign instead of multiplication

8. Evaluate, giving your full calculator display:

$$\sqrt[5]{425}$$

A) 20.61552813 Student square rooted instead of taking fifth root

B) 85 Student typed a division calculation

C) 103.0776406 Student multiplied the square root by five

D) 3.354886145 Correct answer

9. If $r = 6.1$, giving your answer rounded to one decimal place, evaluate:

$$\pi r^2$$

A) 367.2 Student found product of π and r , then squared

B) 116.9 Correct answer

C) $\pi 37.2$ Student does not understand how to compute using π

D) 38.3 Student confused multiplication and exponentiation

Diagnostic Questions: Using a Calculator Answers

10. Use the quadratic formula to find the positive solution (rounded to 2 decimal places) of:

$$3x^2 - 2x - 4 = 0$$

- A) 3.20 Student did not divide $-b$ by $2a$
 B) 4.61 Student forgot to multiply denominator by a
 C) 1.54 Correct answer
 D) 1.46 Student did not square b under the radical

11. Evaluate, giving your answer rounded to two decimal places:

$$\frac{\sqrt{5.38 \times 4.7}}{0.61^2}$$

- A) 8.24 Student applied the radical to numerator and denominator
 B) 29.30 Student applied the radical to 5.38 only
 C) 13.51 Correct answer
 D) 8.22 Student typed denominator as 0.612

12. Evaluate, giving your answer rounded to two decimal places:

$$3.7^3 - \frac{\sqrt{7 - 21}}{5 - 4.96}$$

- A) 4.69 Student did not write the negative sign in their answer
 B) -4.69 Correct answer
 C) 1210.99 Student typed the calculation as one fraction
 D) 4.73 Student attempted to calculate operation by operation

Diagnostic Questions: Using a Calculator Answers

13. Evaluate, giving your answer rounded to two decimal places:

$$\left(2.8^3 - \sqrt{4.8}\right) \div \frac{3.9^2}{7.1 - 1.06}$$

- A) 49.76 Student missed out the division symbol when calculating
- B) 8.05 Student used a cube root instead of square root
- C) 21.08 Student did not enter the brackets on the calculator
- D) 7.85 Correct answer

14. Evaluate, rounding your answer to two decimal places:

$$\tan(3.8)$$

- A) 0.07 Correct answer
- B) 0.77 Student had calculator set in radians
- C) 0.06 Student had calculator set in gradians
- D) 75.26 Student used \tan^{-1}

15. Evaluate, rounding your answer to one decimal place:

$$\cos^{-1}(0.74)$$

- A) 1.0 Student used \cos
- B) 42.3 Correct answer
- C) 0.7 Student had calculator set in radians
- D) 47.0 Student had calculator set in gradians

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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