



THIRD SPACE
LEARNING

Diagnostic Questions

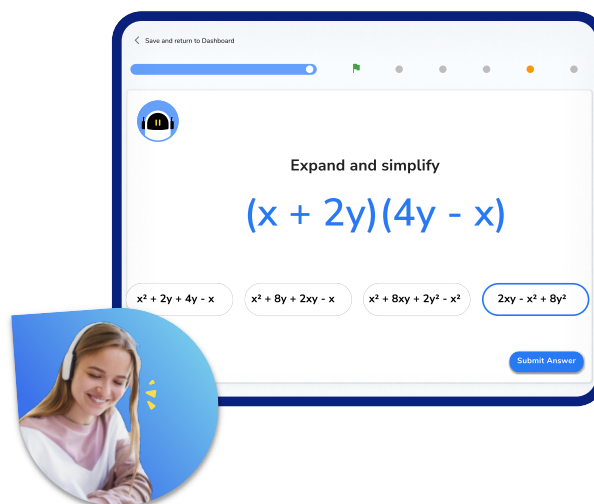
BIDMAS | Number

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 **BIDMAS** 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 **BIDMAS**. Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Incorrectly evaluating operations, Expanding brackets, Roots, and Fractions.**

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: BIDMAS

1. Calculate:

$$3 + 2 \times 4$$

| | |
|-------|-------|
| A) 20 | B) 9 |
| C) 24 | D) 11 |

2. Calculate:

$$5 \times 4 - 7 \times 2$$

| | |
|---------|-------|
| A) - 30 | B) 26 |
| C) 33 | D) 6 |

3. Calculate:

$$24 - 5 \times 3 + 8$$

| | |
|-------|--------|
| A) 17 | B) 209 |
| C) 65 | D) 81 |

Diagnostic Questions: BIDMAS

4. Calculate:

$$27 - 12 \div 3$$

| | |
|-------|-------|
| A) -3 | B) 13 |
| C) 23 | D) 5 |

5. Calculate:

$$18 \div 6 + 4 \times 3$$

| | |
|--------|-------|
| A) 21 | B) 15 |
| C) 5.4 | D) 36 |

6. Calculate:

$$11 - 3^2$$

| | |
|-------|-------|
| A) 64 | B) 2 |
| C) 5 | D) 16 |

Diagnostic Questions: BIDMAS

7. Calculate:

$$10 + 3 \times 4^2$$

| | |
|---------|--------|
| A) 208 | B) 58 |
| C) 2704 | D) 154 |

8. Calculate:

$$3 \times (9 - 5)$$

| | |
|-------|---------|
| A) 22 | B) 12 |
| C) 15 | D) - 12 |

9. Calculate:

$$(23 - 5) \div (2 \times 3)$$

| | |
|-------|-------|
| A) 27 | B) 12 |
| C) 3 | D) 4 |

Diagnostic Questions: BIDMAS

10. Calculate:

$$5^2 - (3 - 7)$$

| | |
|-------|-------|
| A) 29 | B) 21 |
| C) 15 | D) 81 |

11. Calculate:

$$(3 + 5)^2 - 21$$

| | |
|-------|--------|
| A) 7 | B) 169 |
| C) 13 | D) 43 |

12. Calculate:

$$2 \times 22 - (2 + 2)^2$$

| | |
|-------|-------|
| A) 46 | B) 28 |
| C) 38 | D) 40 |

Diagnostic Questions: BIDMAS

13. Expand:

$$6^2 - \sqrt{9 \times 4}$$

| | |
|-------|-------|
| A) 0 | B) 30 |
| C) 66 | D) 18 |

14. Calculate:

$$(5 - 2^3) \times 4$$

| | |
|--------|---------|
| A) 12 | B) - 4 |
| C) 108 | D) - 12 |

15. Calculate:

$$120 - (6^2 + 8^2)$$

| | |
|--------|---------|
| A) 20 | B) 92 |
| C) 148 | D) -176 |

Diagnostic Questions: BIDMAS

16. Calculate:

$$8(5 - 2)^2 \div (4 \times 3)$$

| | |
|------|-------|
| A) 2 | B) 54 |
| C) 6 | D) 18 |

17. Calculate:

$$\sqrt{48 \div 3} - (9 - 4)^2$$

| | |
|---------|---------|
| A) - 93 | B) 29 |
| C) - 9 | D) - 21 |

18. Calculate:

$$3 \times (4^2 - 8 \div 2)$$

| | |
|-------|-------|
| A) 36 | B) 12 |
| C) 20 | D) 0 |

Diagnostic Questions: BIDMAS

19. Calculate:

$$\frac{7^2 - 5 \times 3}{\sqrt{4}}$$

| | |
|--------|--------|
| A) 66 | B) 17 |
| C) - 4 | D) 8.5 |

20. Calculate, giving your answer as a decimal:

$$\frac{7 - (24 \div 8)^2}{9 - 4}$$

| | |
|----------|--------|
| A) - 0.4 | B) 0.8 |
| C) 0.4 | D) 0.2 |

Diagnostic Questions: BIDMAS Answers

1. Calculate:

$$3 + 2 \times 4$$

- A) 20 Student did addition before multiplication
- B) 9 Student found the sum of all three numbers
- C) 24 Student found the product off all three numbers
- D) 11 Correct answer

2. Calculate:

$$5 \times 4 - 7 \times 2$$

- A) -30 Student did the subtraction before multiplication
- B) 26 Student did operations sequentially from left to right
- C) 33 Student did both multiplications then subtracted 7
- D) 6 Correct answer

3. Calculate:

$$24 - 5 \times 3 + 8$$

- A) 17 Correct answer
- B) 209 Student worked out the difference and sum, then multiplied them
- C) 65 Student did operations sequentially from left to right
- D) 81 Student did addition and subtraction, then multiplied by three

Diagnostic Questions: BIDMAS Answers

4. Calculate:

$$27 - 12 \div 3$$

- A) -3 Student divided 27 by 3 before subtracting 12
- B) 13 Student found the sum of 27 and 12, not the difference
- C) 23 Correct answer
- D) 5 Student did operations sequentially from left to right

5. Calculate:

$$18 \div 6 + 4 \times 3$$

- A) 21 Student did operations sequentially from left to right
- B) 15 Correct answer
- C) 5.4 Student did the addition first
- D) 36 Student multiplied instead of adding in second step of calculation

6. Calculate:

$$11 - 3^2$$

- A) 64 Student did subtraction, then squared result
- B) 2 Correct answer
- C) 5 Student doubled 3, rather than squaring
- D) 16 Student subtracted 3 from 11, then doubled

Diagnostic Questions: BIDMAS Answers

7. Calculate:

$$10 + 3 \times 4^2$$

A) 208 Student did the multiplication last

B) 58 Correct answer

C) 2704 Student did operations sequentially from left to right

D) 154 Student multiplied 3 and 4 before squaring

8. Calculate:

$$3 \times (9 - 5)$$

A) 22 Student did not evaluate bracket before multiplying

B) 12 Correct answer

C) 15 Student made arithmetic errors

D) - 12 Student attributed wrong sign to bracket

9. Calculate:

$$(23 - 5) \div (2 \times 3)$$

A) 27 Student calculated from left to right, ignoring brackets

B) 12 Student subtracted, instead of dividing

C) 3 Correct answer

D) 4 Student made arithmetic errors

Diagnostic Questions: BIDMAS Answers

10. Calculate:

$$5^2 - (3 - 7)$$

- A) 81 Student squared as final operation
- B) 21 Student dealt with negative bracket incorrectly
- C) 15 Student did subtraction without considering bracket
- D) 29 Correct answer

11. Calculate:

$$(3 + 5)^2 - 21$$

- A) 7 Student only applied index number to the 5
- B) 169 Student subtracted 21 from 8, then squared
- C) 13 Student found the sum of 3^2 and 5^2 then subtracted 21
- D) 43 Correct answer

12. Calculate:

$$2 \times 22 - (2 + 2)^2$$

- A) 46 Student worked out 2×22 , then subtracted 2, then added 2^2
- B) 28 Correct answer
- C) 38 Student worked out 2×22 , then subtracted 2, then subtracted 2^2
- D) 40 Student worked out 2×22 , then subtracted 2^2

Diagnostic Questions: BIDMAS Answers

13. Expand:

$$6^2 - \sqrt{9 \times 4}$$

A) 0 Student forgot to square root the product under the radical

B) 30 Correct answer

C) 66 Student subtracted $\sqrt{9} = 3$ then multiplied by $\sqrt{4} = 2$

D) 18 Student divided by two rather than square rooting

14. Calculate:

$$(5 - 2^3) \times 4$$

A) 12 Student did not cube 2

B) - 4 Student found 2×3 , rather than 2^3

C) 108 Student subtracted 2 from 5 before cubing

D) - 12 Correct answer

15. Calculate:

$$120 - (6^2 + 8^2)$$

A) 20 Correct answer

B) 92 Student doubled 6 and 8, rather than squaring

C) 148 Student subtracted 6^2 from 120, then added 8^2

D) - 76 Student subtracted $(6 + 8)^2$ from 120

Diagnostic Questions: BIDMAS Answers

16. Calculate:

$$8(5 - 2)^2 \div (4 \times 3)$$

- A) 2 Student forgot to square the result of first bracket
- B) 54 Student divided by 4 then multiplied by 3, instead of dividing by 12
- C) 6 Correct answer
- D) 18 Student made several errors applying the order of operations

17. Calculate:

$$\sqrt{48 \div 3} - (9 - 4)^2$$

- A) - 93 Student subtracted 9^2 and then subtracted 4^2
- B) 29 Student added the second term after squaring
- C) - 9 Student forgot to square root the first term
- D) - 21 Correct answer

18. Calculate:

$$3 \times (4^2 - 8 \div 2)$$

- A) 36 Correct answer
- B) 12 Student performed subtraction before division in the bracket
- C) 20 Student worked from left to right, ignoring the brackets
- D) 0 Student evaluated the bracket as zero by treating 4^2 as 4×2

Diagnostic Questions: BIDMAS Answers

19. Calculate:

$$\frac{7^2 - 5 \times 3}{\sqrt{4}}$$

A) 66 Student calculated numerator from left to right

B) 17 Correct answer

C) - 4 Student did not square 7

D) 8.5 Student did not square root 4

20. Calculate, giving your answer as a decimal:

$$\frac{7 - (24 \div 8)^2}{9 - 4}$$

A) - 0.4 Correct answer

B) 0.8 Student forgot to square the bracket

C) 0.4 Student made an error dealing with negative numbers

D) 0.2 Student doubled the bracket, rather than squaring

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.

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