



THIRD SPACE
LEARNING

Diagnostic Questions

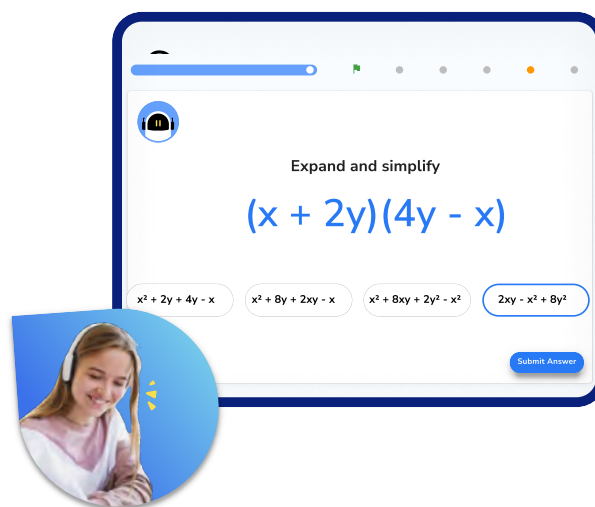
Quadratic Nth Term | Algebra

This resource in a nutshell

Diagnostic questions are a quick and easy way of assessing your students' knowledge and understanding of **quadratic n^{th} term**.

Students may be struggling with a given topic 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 **quadratic n^{th} term**.

Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Order of operations**, **Negative numbers**, **Collecting like terms**, **Finding the n^{th} term**, and **Types of number**.

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: Quadratic Nth Term

1. Find the first three terms of the sequence with n^{th} term rule:

$$3n^2$$

A) 9, 36, 81	B) 3, 12, 27
C) 4, 7, 12	D) 3, 12, 18

2. Find the first three terms of the sequence with n^{th} term rule:

$$n^2 + 5n$$

A) 6, 24, 54	B) 6, 9, 14
C) 2, 6, 12	D) 6, 14, 24

3. Find the first three terms of the sequence with n^{th} term rule:

$$2n^2 - 8$$

A) -7, -4, 1	B) 2, 8, 18
C) -6, 0, 10	D) -6, -8, -6

Diagnostic Questions: Quadratic Nth Term Answers

4. Find the first three terms of the sequence with n^{th} term rule:

$$6 - n^2$$

A) 5, 2, -3 Correct answer

B) 7, 10, 15 Student added rather than subtracted

C) 4, 2, 0 Student subtracted $2n$

D) -6, -24, -54 Student found the sequence for $-6n^2$

5. Find the first three terms of the sequence with n^{th} term rule:

$$7n - 2n^2$$

A) 5, 10, 15 Student first simplified $7n - 2n^2$ to $5n$

B) 5, 20, 45 Student first simplified $7n - 2n^2$ to $5n^2$

C) 5, -1, -11 Student started with 7, not $7n$

D) 5, 6, 3 Correct answer

6. Find the first three terms of the sequence with n^{th} term rule:

$$n^2 + 2n + 3$$

A) 5, 11, 21 Student first mistakenly simplified to $2n^2 + 3$

B) 6, 9, 12 Student first mistakenly simplified to $3n + 3$

C) 6, 11, 18 Correct answer

D) 3, 8, 15 Student forgot to add on the 3

Diagnostic Questions: Quadratic Nth Term

4. Find the first three terms of the sequence with n^{th} term rule:

$$6 - n^2$$

A) 5, 2, -3	B) 7, 10, 15
C) 4, 2, 0	D) -6, -24, -54

5. Find the first three terms of the sequence with n^{th} term rule:

$$7n - 2n^2$$

A) 5, 10, 15	B) 5, 20, 45
C) 5, -1, -11	D) 5, 6, 3

6. Find the first three terms of the sequence with n^{th} term rule:

$$n^2 + 2n + 3$$

A) 5, 11, 21	B) 6, 9, 12
C) 6, 11, 18	D) 3, 8, 15

Diagnostic Questions: Quadratic Nth Term

7. Find the first three terms of the sequence with n^{th} term rule:

$$3n^2 - 4n + 1$$

A) -1, 4, 15	B) 0, 5, 16
C) 8, 21, 40	D) -2, -3, -2

8. The sequence 2, 8, 18, 32, 50 has n^{th} term $2n^2$.

State the n^{th} term of the sequence:

$$7, 18, 33, 52, 75$$

A) $2n^2 + 5$	B) $n^2 + 5n$
C) $2n^2 + 5n$	D) $n^2 + 7$

9. Find the n^{th} term of the sequence with the first five terms:

$$-3, 0, 5, 12, 21$$

A) $n^2 - 3$	B) $2n^2 - 4$
C) $n^2 - 4$	D) $n - 4$

Diagnostic Questions: Quadratic Nth Term

10. Find the n^{th} term of the sequence with the first five terms:

4, 10, 18, 28, 40

A) $2n^2 + 3n$	B) $n^2 + 3n$
C) $6n - 2$	D) $n^2 + 3$

11. Find the n^{th} term of the sequence with the first five terms:

2, 7, 16, 29, 46

A) $2n^2 - n + 1$	B) $4n^2 - n + 1$
C) $2n^2 + n - 1$	D) $2n^2 + 5$

12. Find the n^{th} term of the sequence with the first five terms:

9, 16, 21, 24, 25

A) $2n^2 + 7$	B) $n^2 + 4n + 4$
C) $10n - 2n^2$	D) $10n - n^2$

Diagnostic Questions: Quadratic Nth Term

13. Find the n^{th} term of the sequence with the first five terms:

4, 7, 16, 31, 52

A) $6n^2 - 6n + 7$	B) $3n + 1$
C) $3n^2 - 6n + 7$	D) $n^2 + 2n + 1$

14. Find the n^{th} term of the sequence with the first five terms:

14, 18, 20, 20, 18

A) $14 + 2n$	B) $8 + 7n - n^2$
C) $8 + 7n - 2n^2$	D) $n^2 - 2n + 15$

15. Find the n^{th} term of the sequence with the first five terms:

-2, 1, 6, 13, 22

A) $n^2 - 3n$	B) $n^2 + 3$
C) $2n^2 - 3$	D) $n^2 - 3$

Diagnostic Questions: Quadratic Nth Term Answers

1. Find the first three terms of the sequence with n^{th} term rule:

$$3n^2$$

A) 9, 36, 81 Student multiplied n by 3 before squaring

B) 3, 12, 27 Correct answer

C) 4, 7, 12 Student added 3 to n^2

D) 3, 12, 18 Student doubled n rather than squaring

2. Find the first three terms of the sequence with n^{th} term rule:

$$n^2 + 5n$$

A) 6, 24, 54 Student first simplified $n^2 + 5n$ to $6n^2$

B) 6, 9, 14 Student added 5 instead of $5n$

C) 2, 6, 12 Student added n instead of $5n$

D) 6, 14, 24 Correct answer

3. Find the first three terms of the sequence with n^{th} term rule:

$$2n^2 - 8$$

A) -7, -4, 1 Student forgot to multiply n^2 by 2

B) 2, 8, 18 Student forgot to subtract 8

C) -6, 0, 10 Correct answer

D) -6, -8, -6 Student subtracted $8n$

Diagnostic Questions: Quadratic Nth Term Answers

7. Find the first three terms of the sequence with n^{th} term rule:

$$3n^2 - 4n + 1$$

- A) -1, 4, 15 Student forgot to add 1
- B) 0, 5, 16 Correct answer
- C) 8, 21, 40 Student added $4n$
- D) -2, -3, -2 Student did not multiply n^2 by 3

8. The sequence 2, 8, 18, 32, 50 has n^{th} term $2n^2$.

State the n^{th} term of the sequence:

$$7, 18, 33, 52, 75$$

- A) $2n^2 + 5$ Student only considered first term
- B) $n^2 + 5n$ Student missed the coefficient of n^2
- C) $2n^2 + 5n$ Correct answer
- D) $n^2 + 7$ Student doesn't understand how to form the quadratic n^{th} term

9. Find the n^{th} term of the sequence with the first five terms:

$$-3, 0, 5, 12, 21$$

- A) $n^2 - 3$ Student did not find the constant term correctly
- B) $2n^2 - 4$ Student did not half the second difference
- C) $n^2 - 4$ Correct answer
- D) $n - 4$ Student attempted to find a linear n^{th} term rule

Diagnostic Questions: Quadratic Nth Term Answers

10. Find the n^{th} term of the sequence with the first five terms:

4, 10, 18, 28, 40

- A) $2n^2+3n$ Student did not half second difference
- B) n^2+3n Correct answer
- C) $6n-2$ Student attempted to find a linear n^{th} term rule
- D) n^2+3 Student did not find the correct additive term

11. Find the n^{th} term of the sequence with the first five terms:

2, 7, 16, 29, 46

- A) $2n^2-n+1$ Correct answer
- B) $4n^2-n+1$ Student did not find half of second difference
- C) $2n^2+n-1$ Student got signs mixed up
- D) $2n^2+5$ Student does not understand how to form the quadratic n^{th} term

12. Find the n^{th} term of the sequence with the first five terms:

9, 16, 21, 24, 25

- A) $2n^2+7$ Student only considered the first term
- B) n^2+4n+4 Student made several errors
- C) $10n-2n^2$ Student did not half the second difference
- D) $10n-n^2$ Correct answer

Diagnostic Questions: Quadratic Nth Term Answers

13. Find the n^{th} term of the sequence with the first five terms:

4, 7, 16, 31, 52

- A) $6n^2-6n+7$ Student did not half the second difference
- B) $3n+1$ Student tried to form an arithmetic sequence
- C) $3n^2-6n+7$ Correct answer
- D) n^2+2n+1 Student did not use all five terms to generate the n^{th} term

14. Find the n^{th} term of the sequence with the first five terms:

14, 18, 20, 20, 18

- A) $14+2n$ Student tried to find an arithmetic sequence
- B) $8+7n-n^2$ Correct answer
- C) $8+7n-2n^2$ Student did not half the second difference
- D) $n^2-2n+15$ Student made several errors

15. Find the n^{th} term of the sequence with the first five terms:

-2, 1, 6, 13, 22

- A) n^2-3n Student incorrectly wrote 3 as $3n$
- B) n^2+3 Student used incorrect sign
- C) $2n^2-3$ Student did not half the second difference
- D) n^2-3 Correct answer

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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