MATHEMATICS · GRADES 10-12

Identifying quadratic expressions

Difficulty level: Advanced

Mathematics: Grades 10-12

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Overview of the concept

This is how you recognise an expression with a squared term, like the formula for the area of a square, so you know it will behave like a curve rather than a straight line. A squared term changes everything, because the values no longer grow steadily, they speed up. You meet quadratic expressions in the area of a garden, the path of a thrown ball, and the profit of a business that grows and then falls, and spotting one early tells you which tools to reach for.



Rule

An expression is quadratic when its highest power is 2.

Find the biggest exponent on the variable. If it is 2, the expression is quadratic, and if it is anything else, it is not.

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Worked examples

EXAMPLE 1

Q Is $x^2 + 3x + 2$ quadratic?

SOLUTION

Find the highest power of x: it is 2, from x^2.

A polynomial with highest power 2 is quadratic.

So yes, $x^2 + 3x + 2$ is quadratic.

EXAMPLE 2

Q Is $2x + 1$ quadratic?

SOLUTION

Find the highest power of x: it is 1, from 2x.

A polynomial with highest power 1 is linear, not quadratic.

So no, 2x + 1 is not quadratic.

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Practice questions

1

Is $x^2 + 5$ quadratic? Answer yes or no.

A yes

B no

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2

Is $3x - 2$ quadratic? Answer yes or no.

A yes

B no

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3 What is the highest power of x in $4x^2 - 7x$?

- A 1
- B 2
- C 4
- D 7

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4 The highest power of x in $x^3 + x$ is 3. Is it quadratic? Answer yes or no.

- A yes
- B no

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5 5 has no x term at all. Is it quadratic? Answer yes or no.

A yes

B no

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6 $2x^2 + 3x - 1$ has an x^2 term and nothing higher. Is it quadratic? Answer yes or no.

A yes

B no

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7 In $x^2 - x^2 + 3x$ the x^2 terms cancel. Is it quadratic? Answer yes or no.

A yes

B no

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8 Is $-x^2 + 4$ quadratic? Answer yes or no.

A yes

B no

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9 $x + x^2$ has terms in x and x^2. Is it quadratic? Answer yes or no.

A yes

B no

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10 **Which of these is quadratic?**

A $7x$

B x^3

C 5

D $x^2 - 1$

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ANSWER KEY

1. yes

2. no

3. 2

4. no

5. no

6. yes

7. no

8. yes

9. yes

10. $x^2 - 1$

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