MATHEMATICS · GRADES 10-12

Introduction to quadratic relationships

Difficulty level: Advanced

Mathematics: Grades 10-12

This document was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

Overview of the concept

This is how you recognise a pattern that grows by squaring, like the area of a square garden doubling in a way that is not steady, so you know a curve is coming. When a quantity depends on a square, it does not grow steadily, it speeds up, and that changes how you predict it. You meet it in the area of a garden that grows as you widen it, the height of a thrown ball, and the profit of a shop that rises and then falls as prices change.



© 2026 Brett Robbins. All Rights Reserved.

Worked examples

EXAMPLE 1

Q Make a table for $y = x^2$

SOLUTION

Choose x values: 0, 1, 2.

Square each one: $0^2 = 0$, $1^2 = 1$, $2^2 = 4$.

Write the pairs: (0, 0), (1, 1), (2, 4). The outputs grow faster as x grows.

EXAMPLE 2

Q Make a table for $y = 2x^2 - 3$

SOLUTION

Choose x values: 0, 1, 2.

Work each one out: $2 \times 0 - 3 = -3$; $2 \times 1 - 3 = -1$; $2 \times 4 - 3 = 5$.

Write the pairs: (0, -3), (1, -1), (2, 5).

© 2026 Brett Robbins. All Rights Reserved.

Practice questions

1 Make a table for $y = x^2$ for these values of x:

0

1

2

3

A (0, 0), (1, 1), (2, 4), (3, 6)

B (0, 0), (1, 1), (2, 4), (3, 9)

C (0, 1), (1, 2), (2, 5), (3, 10)

D (0, 0), (1, 2), (2, 4), (3, 8)

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

2 Which equation is quadratic?

A $y = 2x + 1$

B $y = x^2 - 3$

C $y = 5$

D $y = 3x$

Understand It with Pulse | Flag a mistake

3 For $y = x^2$, which x gives $y = 25$?

A 5

B 25

C 12

D 625

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

4 The table shows $x = 0, 1, 2, 3$ and $y = 0, 1, 4, 9$. Which equation makes this table?

- **A** $y = x^2$
- **B** $y = 2x$
- **C** $y = x + 1$
- **D** $y = x^3$

Understand It with Pulse | Flag a mistake

5 What is the smallest value of $y = x^2$?

- **A** 0
- **B** 1
- **C** -1
- **D** It has no smallest value

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

6 For $y = x^2$, find y when $x = 4$

Understand It with Pulse | Flag a mistake

7 For $y = 2x^2$, how much does y increase when x goes from 1 to 2?

A 6

B 4

C 2

D 8

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

8 How many values of x give y = 9 for $y = x^2$?

- A 2
- B 1
- C 0
- D 3

Understand It with Pulse | Flag a mistake

9 For $y = x^2 - 4$, which x value gives y = 0?

- A 2
- B 0
- C 4
- D -4

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

10 The graph of $y = x^2$ goes through $(2, 4)$. Which other point is on the graph?

- **A** $(-2, 4)$
- **B** $(2, -4)$
- **C** $(-2, -4)$
- **D** $(4, 2)$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

ANSWER KEY

1. (0, 0), (1, 1), (2, 4), (3, 9)

2. $y = x^2 - 3$

3. 5

4. $y = x^2$

5. 0

6. 16

7. 6

8. 2

9. 2

10. (-2, 4)

© 2026 Brett Robbins. All Rights Reserved.