Your notes

GCSE Maths: revision notes

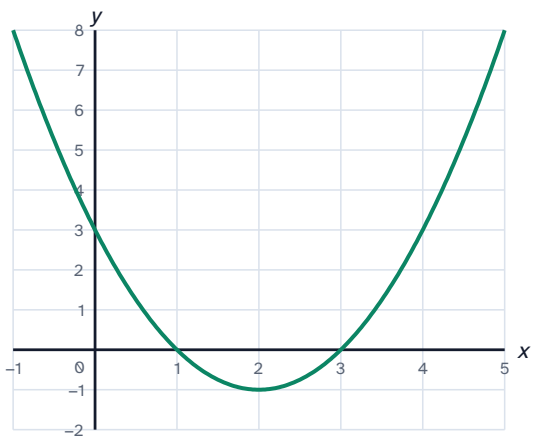
Quadratic, cubic and reciprocal graphs

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Quadratic graphs

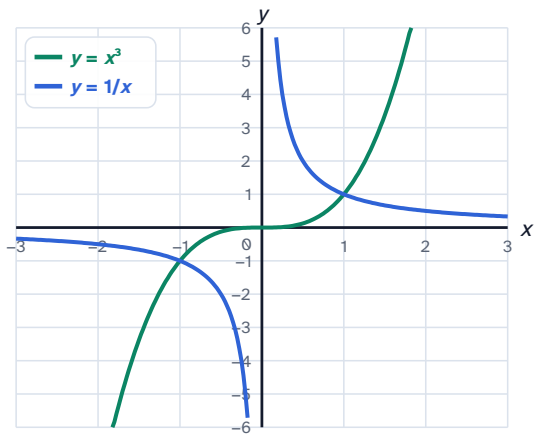
- The graph of $y = x^2$ (or any quadratic) is a U-shaped curve called a **parabola**. If the x^2 term is negative, it is n-shaped.
- The **roots** are where the curve crosses the x-axis. The y-intercept is where it crosses the y-axis. The **turning point** is the lowest (minimum) or highest (maximum) point.
- The curve is symmetrical about a vertical line through the **turning point**.
- $y = x^2 - 4x + 3$ has **roots** $x = 1$ and $x = 3$, y-intercept 3 and **turning point** (2, –1).



Cubic and reciprocal graphs

- A **cubic graph**, such as $y = x^3$, is S-shaped. If the x^3 term is positive it goes from bottom left to top right.
- The **reciprocal graph** $y = 1/x$ has two separate curves (branches). They get closer and closer to the axes but never touch them, and x cannot be 0.

- (Higher) An exponential graph $y = k^x$ ($k > 1$) passes through (0, 1), grows faster and faster, and never goes below the x-axis.
- (Higher) $y = \sin x$ and $y = \cos x$ repeat every 360° and stay between –1 and 1. $y = \tan x$ repeats every 180°.

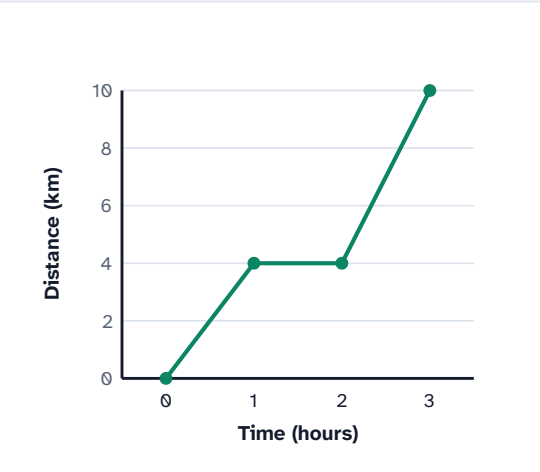


Drawing and using graphs

- Complete a table of values, plot the points and join them with a smooth curve, not straight lines.
- The solutions of $x^2 - 4x + 3 = 0$ are where $y = x^2 - 4x + 3$ crosses the x-axis. To solve $x^2 - 4x + 3 = 2$, find where the curve meets the line $y = 2$.

Real-life graphs

- On a distance-time graph, the gradient is the speed. A horizontal line means the object has stopped.
- On a conversion graph, read across from one axis and down to the other.



Key terms

Parabola	The U-shaped or n-shaped curve of a quadratic graph.
Roots	The x-values where a graph crosses the x-axis.
Turning point	The minimum or maximum point of a curve.

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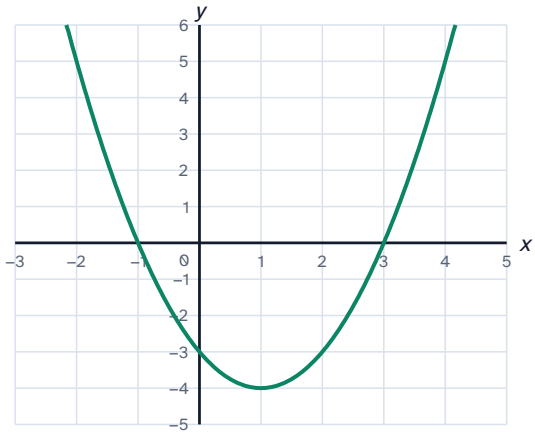
Line of symmetry	A line that divides a graph into two mirror images.
Cubic graph	The S-shaped graph of an equation with x^3 as the highest power.
Reciprocal graph	The graph of $y = k/x$, with two branches that never touch the axes.
Asymptote	A line that a curve gets closer and closer to but never touches.

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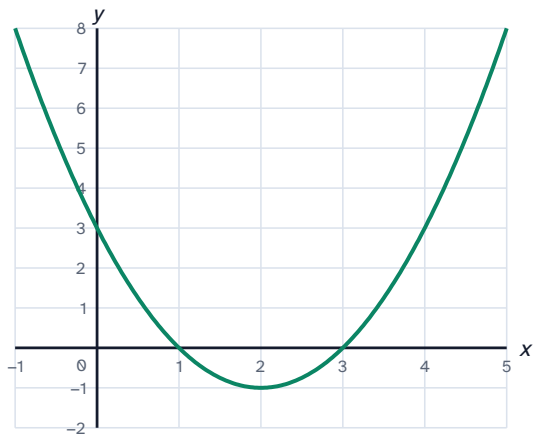
Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

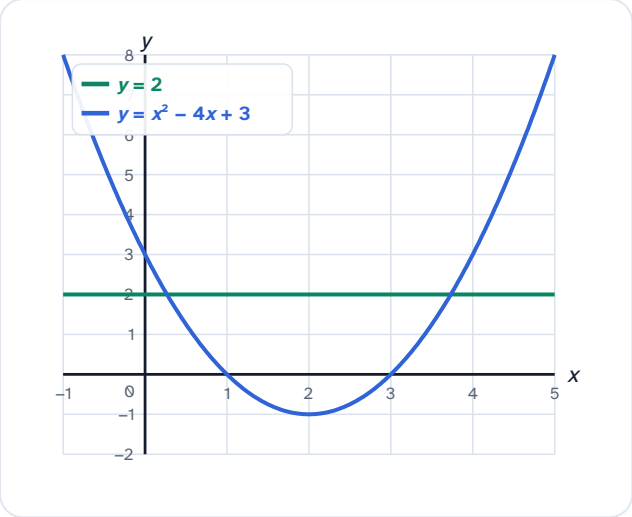
1. What shape is the graph of $y = x^2$?
2. What are the roots of a quadratic graph?



3. Which graph has two separate branches and never touches the axes?
4. What shape is the graph of $y = x^3$?
5. What is the y-intercept of $y = x^2 - 4x + 3$?
6. $y = x^2 - 4x + 3$ crosses the x-axis at $x = 1$ and $x = 3$. What is the x-coordinate of its turning point?



7. What shape is the graph of $y = 4 - x^2$?
8. How do you use the graph of $y = x^2 - 4x + 3$ to solve $x^2 - 4x + 3 = 2$?



Answers

1. A U-shaped curve (parabola)
2. Where the curve crosses the x-axis
3. y = 1/x
4. An S-shaped curve
5. 3
6. 2
7. n-shaped, with a maximum point
8. Find where the curve meets the line y = 2

What to do next

Practise 13 questions on this topic

Try 6 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.

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