Your notes

GCSE Maths: revision notes

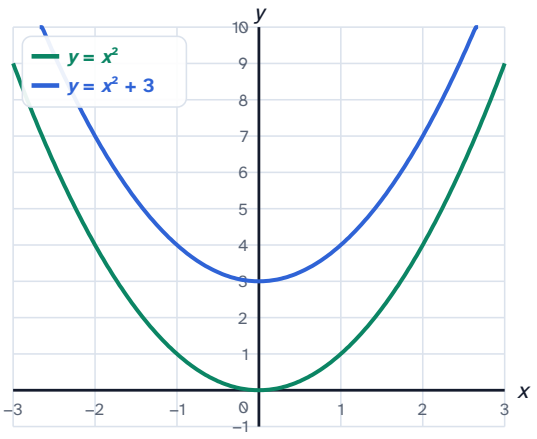
Transformations of graphs

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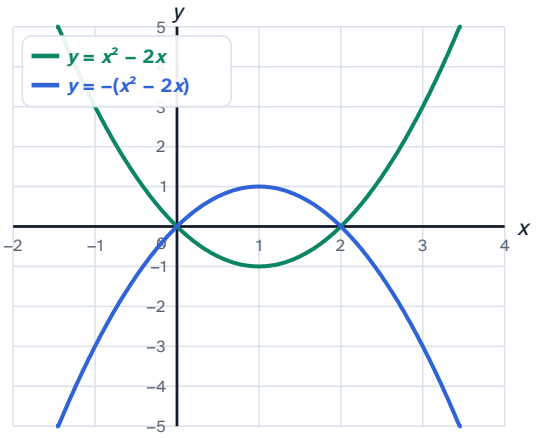
Translations

- $y = f(x) + a$ moves the graph up by a units (down if a is negative).
- $y = f(x + a)$ moves the graph left by a units. Inside the bracket, the direction is the opposite of what you might expect: $y = f(x – 2)$ moves it right by 2.
- $y = (x – 2)^2$ is $y = x^2$ moved 2 units right, so its **turning point** is (2, 0).



Reflections

- $y = –f(x)$ reflects the graph in the x-axis: every y-value changes sign.
- $y = f(–x)$ reflects the graph in the y-axis: every x-value changes sign.



Your notes

Following a point

- If y = f(x) has a **turning point** at (3, 4):
- y = f(x) + 2 has it at (3, 6); y = f(x – 1) at (4, 4); y = –f(x) at (3, –4); y = f(–x) at (–3, 4).

Key terms

Transformation	A change to the position or shape of a graph.
Translation	Sliding a graph without turning or flipping it.
Reflection	Flipping a graph in a mirror line, such as an axis.
f(x)	Function notation for an expression in x, such as $f(x) = x^2$.
Turning point	The minimum or maximum point of a curve.

Quick questions

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

1. What does y = f(x) + 3 do to the graph of y = f(x)?
2. What does y = f(x + 3) do to the graph of y = f(x)?
3. What does y = –f(x) do to the graph of y = f(x)?
4. What does y = f(–x) do to the graph of y = f(x)?
5. The graph of $y = x^2$ is moved 2 units right. What is its new equation?
6. The graph of $y = x^2$ is moved 5 units up. What is its new equation?
7. y = f(x) has a turning point at (3, 4). Where is the turning point of y = f(x) + 2?
8. y = f(x) has a turning point at (3, 4). Where is the turning point of y = f(x – 1)?

Answers

1. Moves it up 3
2. Moves it left 3
3. Reflects it in the x-axis
4. Reflects it in the y-axis

5. $y = (x - 2)^2$
6. $y = x^2 + 5$
7. (3, 6)
8. (4, 4)

What to do next

Practise 12 questions on this topic

Try 4 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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