

DEMO: Fundamentals of Algebra and Calculus

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Quiz navigation

Quadratics

Progress indicators for Quadratics: 1 (checked), 2, 3, 4

Quadratic intersections

Progress indicators for Quadratic intersections: 5, 6 (checked), 7, 8, 9, 10

Cubics

Progress indicators for Cubics: 11 (checked), 1

Higher degrees

Progress indicators for Higher degrees: 12 (checked), 13, 14, 15

Finish attempt ...

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Sketching graphs of cubics

Using the Factor Theorem, we can take the fully factorised form of a cubic and read off its roots. This enables us to make a sketch of the graph.

Example

Sketch the graph of the polynomial function $f(x) = x^3 - 3x^2 + 4$.

Different forms of cubic graph are possible, based on the factors in the fully factorised form:

- each linear factor will give a root,
- any repeated linear factors will give rise to a repeated root on the graph,
- a quadratic factor which cannot be factorised further will mean the graph only has one real root.

Another thing to look for is the sign of the x^3 coefficient - if it is positive, then the graph goes off to $+\infty$ as x increases, while if it's negative the graph will go off to $-\infty$.

Information

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The following are all the possible forms that the factorised cubic can take:

- $a(x - \alpha)(x - \beta)(x - \gamma)$
- $a(x - \alpha)^2(x - \beta)$
- $a(x - \alpha)^3$
- $(x - \alpha)(ax^2 + bx + c)$ with $b^2 - 4ac < 0$

Complete the following table showing what a sketch of the graph might look like for each form:

	$a(x - \alpha)(x - \beta)(x - \gamma)$	$a(x - \alpha)^2(x - \beta)$	$a(x - \alpha)^3$	$(x - \alpha)(ax^2 + bx + c)$ where $b^2 - 4ac < 0$
$a > 0$				
$a < 0$				

Check

Question 11

Tries remaining: 1

Marked out of 1.00

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Which of the following could be the graph of $y = (x + 3)(x^2 + x + 2)$? (No answer given)


What is the value of α on the sketch?

Check

Information

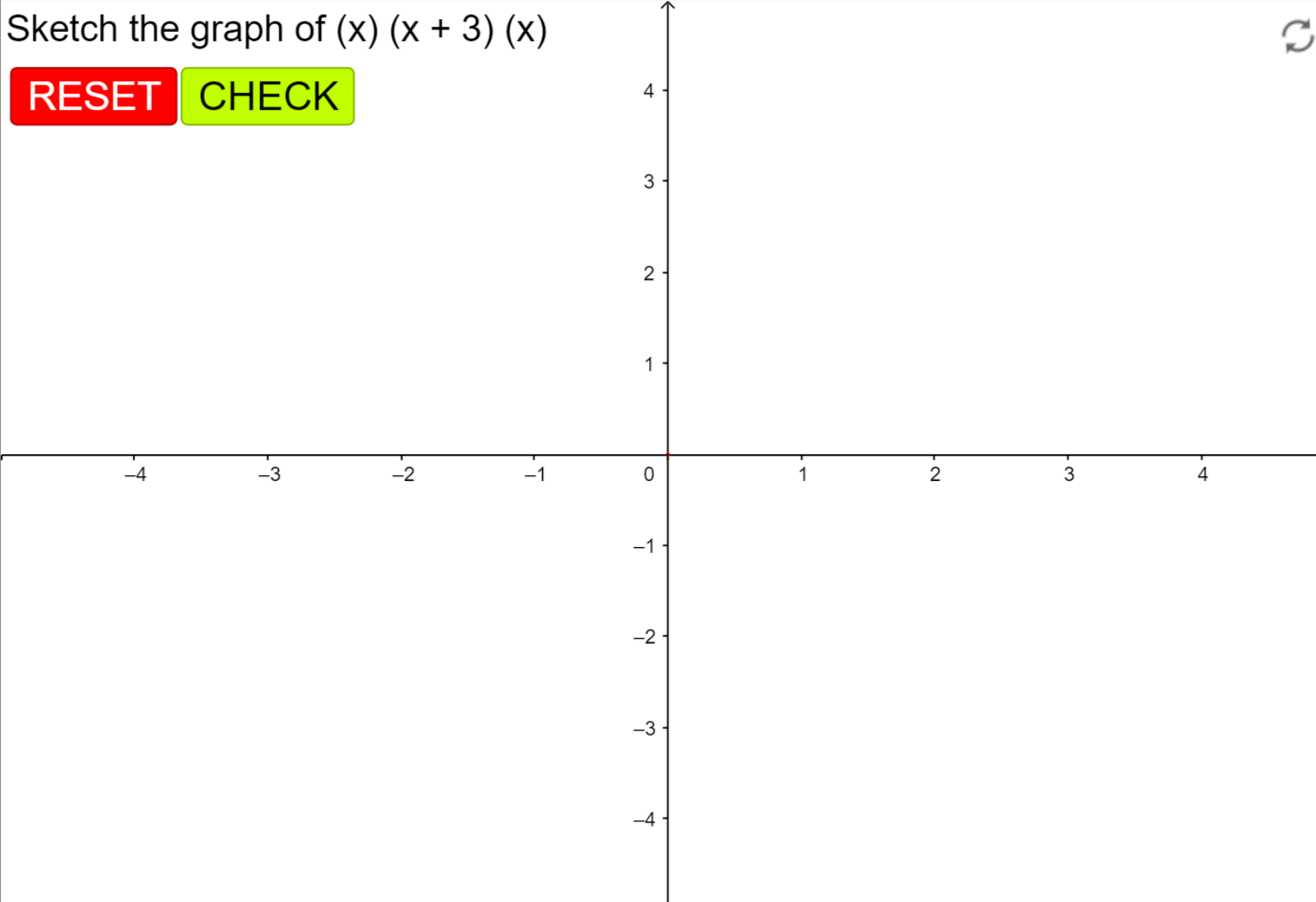
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You can use this applet to practise drawing cubic graphs:



Sketch the graph of $(x)(x + 3)(x)$

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3. The Binomial Theorem ▶

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