Power functions and graph transformations

Learn and practise | Free preview

A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the worked example, then show each step in the practice questions. Show the mathematical steps. A calculator, graphing tool or CAS may be used to check results where useful.

What you will practise

• Power functions and transformations of the plane

Useful starting skills: Year 10 algebra, factorisation, functions, indices, geometry and elementary probability.

Start with a known power graph, such as x^2, x^3, $\sqrt{x}$, $1/x$ or $1/x^2$, and track its key points and domain.

For $y=a\,f(x+b)+c$, the inside shift moves the graph left by b, the outside multiplier changes vertical scale, and c shifts vertically. Negative multipliers reflect.

Worked example

Describe $y=-2(x-3)^2+4$ relative to $y=x^2$.

The vertex moves from (0, 0) to (3, 4)

the negative coefficient makes the parabola open down.

Answer: Right 3; vertical stretch 2; reflection in x-axis; up 4.

Try it yourself

Name: _____ Date: _____

1. State vertex, axis and range of $y=3(x+2)^2-5$.

2. Find asymptotes of $y=2/(x-1)+3$.

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. Vertex (-2, -5); x=-2; range [-5, ∞).

The squared term is non-negative and coefficient 3 is positive.

2. x=1 and y=3.

The denominator vanishes at 1; the reciprocal term tends to 0 far from 1.

Curriculum reference: Mathematical Methods Units 1–2 — Power functions and transformations of the plane

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