

2.4.6 Graph Transformations

Name: _____ Class: _____ Date: _____

KEY WORDS graph translation

<!-- Session 2 native-skill companion -->

Objective

Practise graph transformations within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Translations and reflections of function graphs · Higher

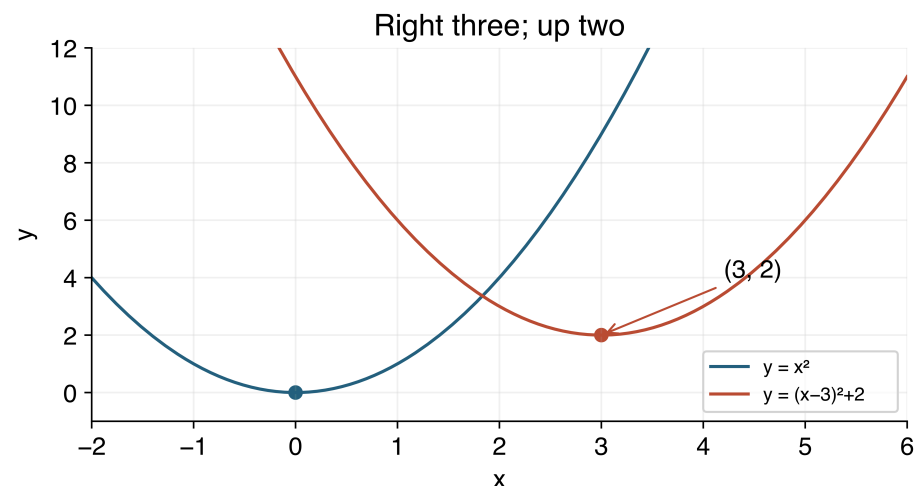
$y=f(x)+a$ shifts the output up by a . $y=f(x-a)$ shifts the graph right by a . $y=-f(x)$ reflects in the x -axis; $y=f(-x)$ reflects in the y -axis. Transform the points as well as the formula, checking a known feature.

$$y = (x - 3)^2 + 2$$

With $f(x)=x^2$, $y=f(x-3)+2=(x-3)^2+2$ has vertex $(3,2)$. The point $(1,1)$ on f moves to $(4,3)$. At $x=4$ the new output is 3. The reflection $y=-x^2$ turns the minimum at the origin into a maximum. For a nonsymmetric graph, $f(-x)$ mirrors each x -coordinate, not each y -coordinate.

A positive number added inside the input, $f(x+3)$, moves the graph left, not right. A reflection in the y -axis changes x ; a reflection in the x -axis changes y .

AQA A13 Higher covers translations and reflections of a given function. Use features and transformed points to justify the sketch; do not substitute a geometric enlargement for this graph transformation.



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Higher) Find the vertex x -coordinate of $(x-3)^2+2$.

2.2 (Higher) Find its vertex y -coordinate.

2.3 (Higher) Find its output at $x=4$.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: The graph $y=f(x+3)$ always moves three units to the right.

Solutions

2.1 The squared term is zero at $x=3$.

2.2 At $x=3$, the output is 2.

2.3 $(4-3)^2+2=3$.

3.1 False. For $f(x)=x^2$, $y=(x+3)^2$ has vertex $(-3,0)$, three units left of $(0,0)$.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.