Math Builders

Transformation Builder

Transformations include translations, reflections, and stretches and compressions. This Math Builder shows you how to apply transformations of all types to the quadratic parent function, $f(x) = x^2$.

The clear sheets are the overlays. The page beneath them is the base.

BASE

Look at the base. It shows the quadratic parent function, $f(x) = x^2$, and its graph.

OVERLAY 1

Drop Overlay 1 onto the base. This overlay shows how to apply translations to the graphs of quadratic functions.

OVERLAY 2

Drop Overlay 2 onto the base. This overlay shows how to apply stretches, compressions, and reflections to the graphs of quadratic functions.

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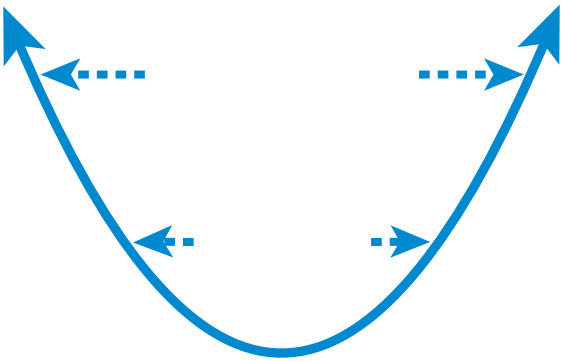
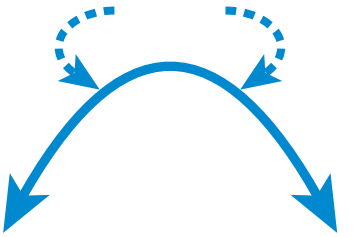
OVERLAY 2: Stretch, Compression, and Reflection



$$h(x) = \left(\frac{1}{2}x\right)^2 - 3$$

Multiply x by $\frac{1}{2}$ to horizontally **stretch** the parabola.



$$h(x) = -\frac{1}{3}(x + 2)^2$$

Multiply by $-\frac{1}{3}$ to vertically **compress** the parabola and **reflect** it across the x-axis.

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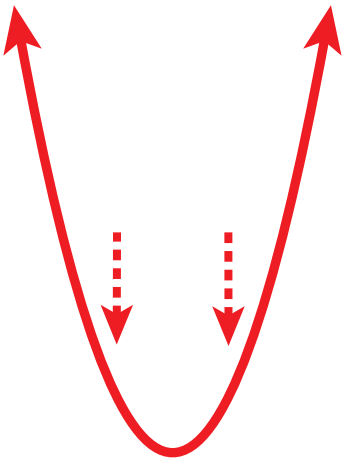
OVERLAY 1: Translations

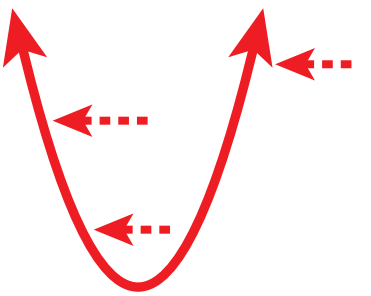
$g(x) = x^2 - 3$

Subtract 3 from x^2 to **shift (or translate)** the parabola 3 units down.



$g(x) = (x + 2)^2$

Add 2 to x to **shift (or translate)** the parabola 2 units left.



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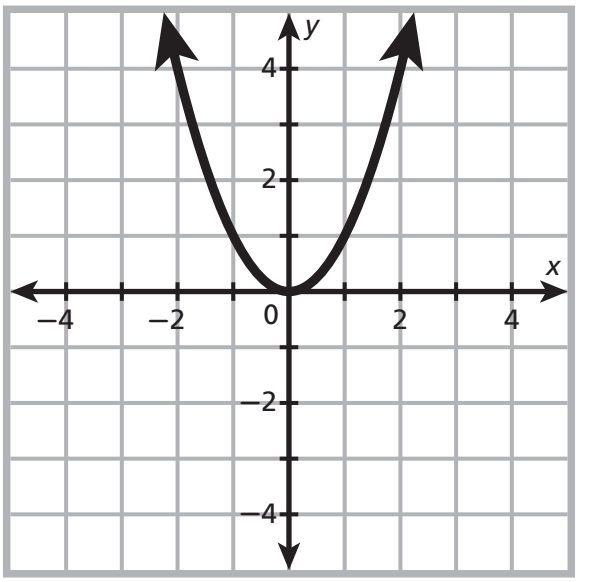
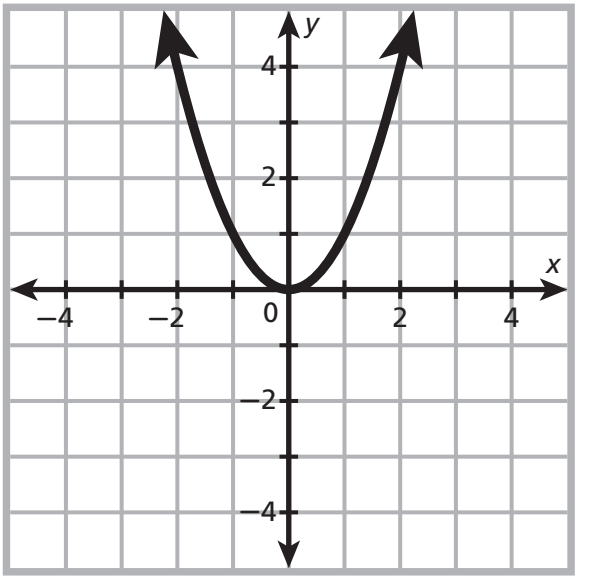
BASE: Quadratic Parent Function

$f(x) = x^2$



$f(x) = x^2$



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Math Builders

Transformation Builder

Transformations include translations, reflections, and stretches and compressions. This Math Builder shows you how to apply transformations of all types to one parent exponential function, $f(x) = 2^x$.

The clear sheets are the overlays. The page beneath them is the base.

BASE

Look at the base. It shows the exponential parent function $f(x) = 2^x$ and its graph.

OVERLAY 1

Drop Overlay 1 onto the base. This overlay shows how to apply translations to the graphs of exponential functions.

OVERLAY 2

Drop Overlay 2 onto the base. This overlay shows how to apply stretches, compressions, and reflections to the graphs of exponential functions.

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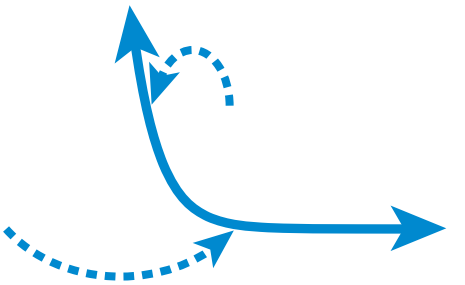
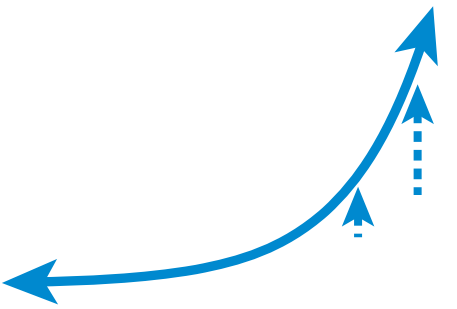
OVERLAY 2: Stretch, Compression, and Reflection



$h(x) = 2^{-3x} + 1$

Multiply x by -3 to horizontally **compress** the curve and **reflect** it across the y-axis.



$h(x) = 3 \cdot 2^{(x-2)}$

Multiply by 3 to vertically **stretch** the curve.

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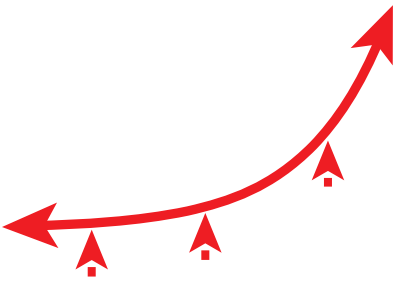
OVERLAY 1: Translations

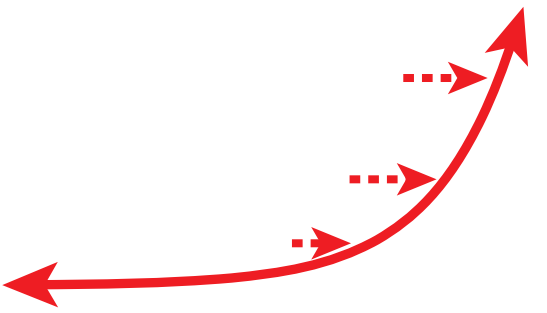
$g(x) = 2^x + 1$

Add 1 to vertically **shift (or translate)** the curve 1 unit up.



$g(x) = 2^{(x-2)}$

Subtract 2 from x to **shift (or translate)** the curve 2 units right.



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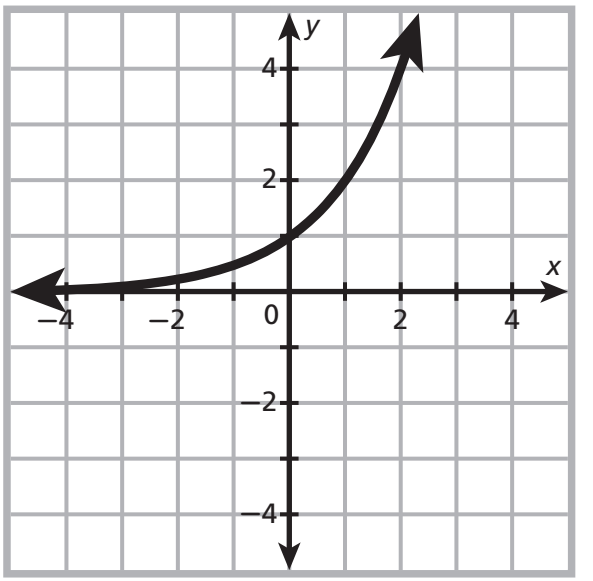
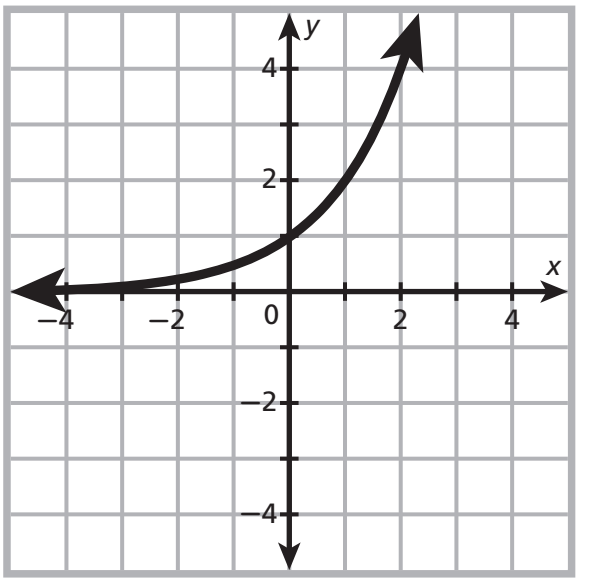
BASE: Exponential Parent Function

$f(x) = 2^x$



$f(x) = 2^x$



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