

Horizontal vs Vertical Scaling

Horizontal reflections and scaling were not covered as part of grade 10 quadratics. Why not?

Ex.1 Horizontal Reflections

Consider $y = f(-x)$ given:

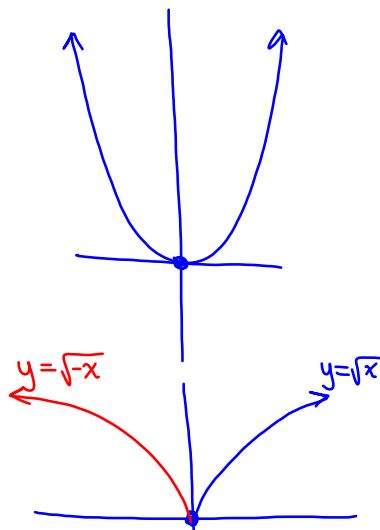
(a) $f(x) = x^2$ (b) $f(x) = \sqrt{x}$

$y = f(-x)$
 ① h. reflection

if $f(x) = x^2$

$$\begin{aligned} y &= f(-x) \\ &= (-x)^2 \\ &= x^2 \end{aligned}$$

(b) $y = f(-x)$
 $= \sqrt{-x}$



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Ex.2 Horizontal Compressions

Consider $y = f(4x)$ given:

(a) $f(x) = x^2$ (b) $f(x) = \sqrt{x}$

$y = f(4x) \rightarrow$ h. compress by 4

$$= (4x)^2$$

$$= 16x^2$$

\rightarrow v. stretch by 16

↑ look the same for $y = x^2$

(b) $y = f(4x) \rightarrow$ h. compress by 4

$$= \sqrt{4x}$$

$$= \sqrt{4} \sqrt{x}$$

$$= 2\sqrt{x}$$

\rightarrow v. stretch by 2

↑ look the same for $y = \sqrt{x}$

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Ex.3 Horizontal Compressions

Consider $y = f(3x)$ given:

(a) $f(x) = \frac{1}{x}$ (b) $f(x) = \sqrt{x}$

$$y = f(3x) \rightarrow \text{h. compress by } 3$$

$$= \frac{1}{3x}$$

$$= \frac{1}{3} \left(\frac{1}{x} \right) \rightarrow \text{v. compress by } 3$$

$$(b) \quad y = f(3x) \rightarrow \text{h. compress by } 3$$

$$= \sqrt{3x}$$

$$= \sqrt{3} \sqrt{x} \rightarrow \text{v. stretch by } \sqrt{3}$$

$$y \rightarrow \sqrt{3} y$$

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Some functions can have their transformations changed algebraically from one type to another. The possible changes depend upon the parent function.

For example,

(a) quadratic, radical

vertical stretch = horizontal compression
vertical compression = horizontal stretch

(b) rational

vertical stretch = horizontal stretch
vertical compression = horizontal compression

Mar 3-6:53 PM

worksheet + any previous homework

Mar 5-1:15 PM