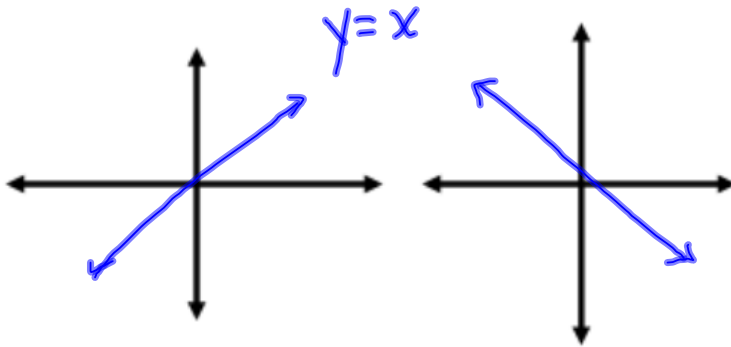


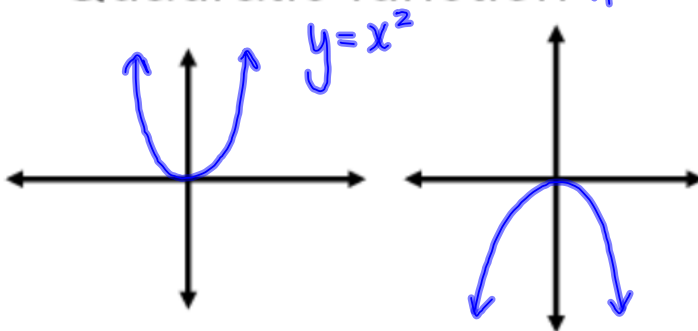
# Shapes of graphs- parent functions

## Linear function



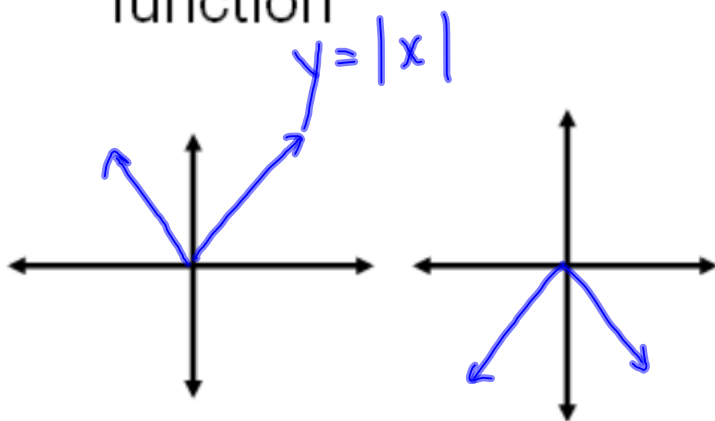
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## Quadratic function (parabola)



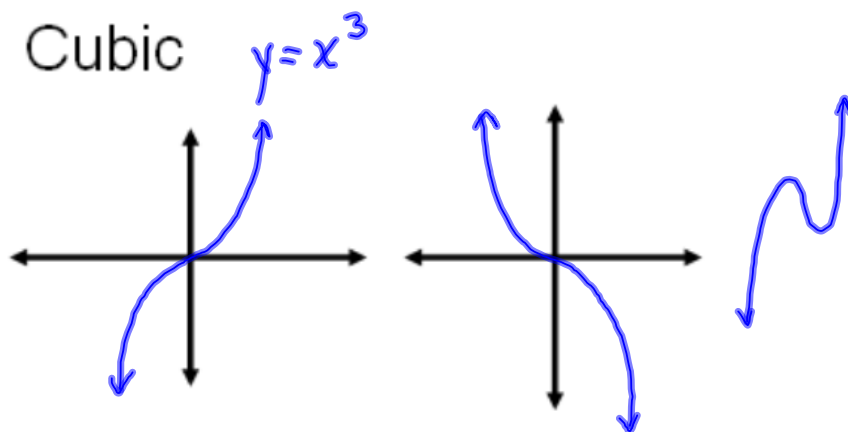
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# Absolute Value function



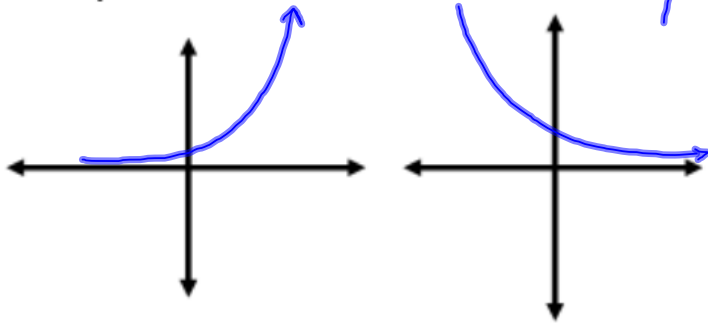
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# Cubic



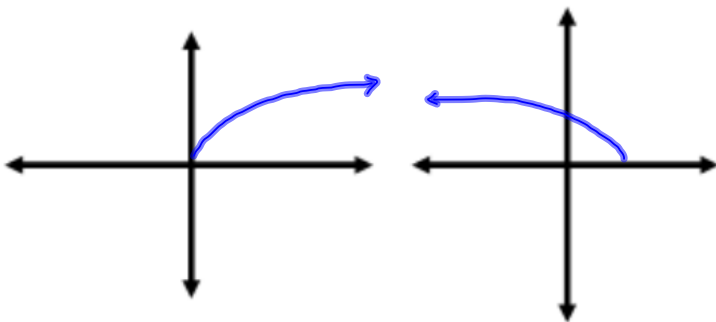
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Exponential function  $y = b \cdot g^x$



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Square root  $y = \sqrt{x}$

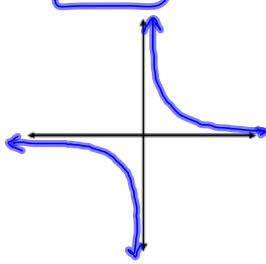


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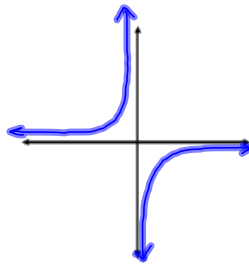
# Hyperbola

$$f(x) = 1/x$$

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



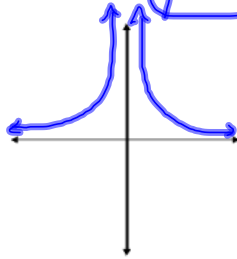
$$f(x) = -1/x$$



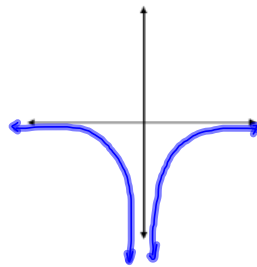
# Tree Trunk

$$f(x) = 1/x^2$$

$$y = \frac{1}{x^2}$$



$$f(x) = -1/x^2$$

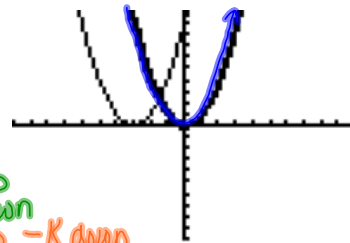


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# Vertical and Horizontal shifts -

$$h(x) = f(x + h) + k$$

shifts left or right  
 +h left    -h right  
 shift up and down  
 +k up    -k down



Graph:  $y = x^2$

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

move 3 left

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

right 2

$$y = (x - 5)^2$$

right 5

$y = x^3$

$$y = (x + 4)^3$$

left 4

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

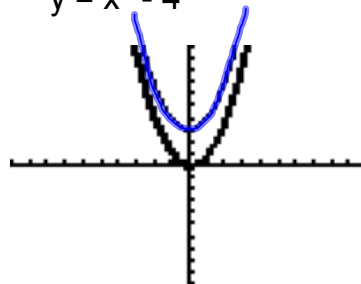
right 2

Graph:  $y = x^2$

$$y = x^2 + 3$$

up 3

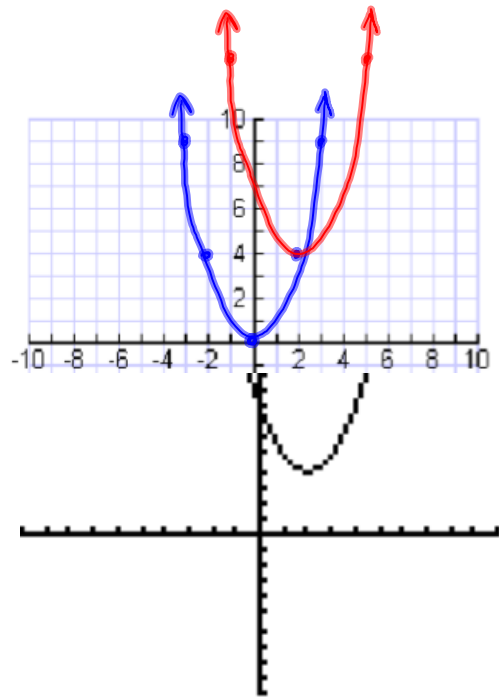
$$y = x^2 - 4$$



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$$y = (x - 2)^2 + 4$$

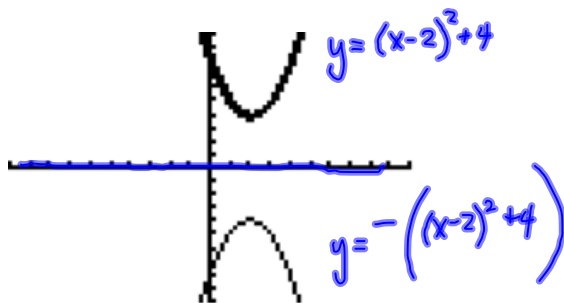
parent function:  $y = x^2$   
 shift left or right: right 2  
 shift up or down: up 4



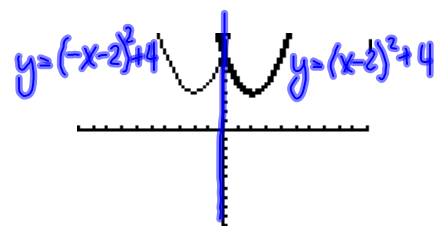
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### Reflections over axis

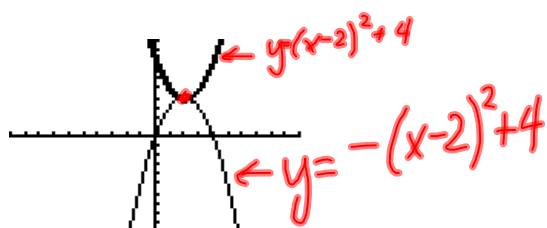
Reflection in the x-axis:  $h(x) = -f(x)$



Reflection in the y-axis:  $h(x) = f(-x)$



### Drop Down



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identify parent function & describe movement

#16 - 26 even

#52 - 70 even

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