# Skill AA2: Graphs and their transformations

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I can sketch the parent graph of a:
  a. Linear Function $y = x$
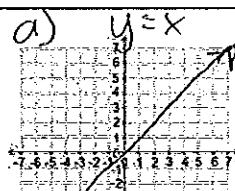 	
  b. Quadratic Function $y = x^2$
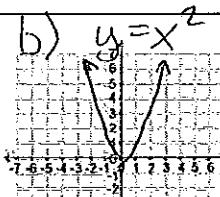 	
  c. Cubic Function $y = x^3$
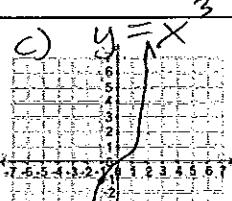 	
  d. Square Root Function $y = \sqrt{x}$
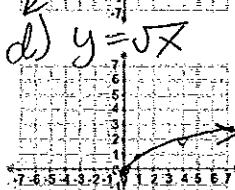 	
  e. Cube Root Function $y = \sqrt[3]{x}$
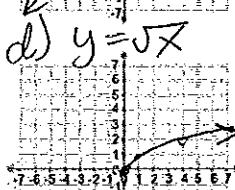 	
  f. Absolute Value Functions $y = \lvert x \rvert$
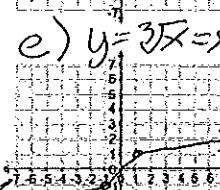 	
  g. Rational Functions $y = \frac{1}{x}$
	a) $y = x$ b) $y = x^2$ c) $y = x^3$
	
	d) $y = \sqrt{x}$ e) $y = \sqrt[3]{x} = x^{1/3}$ f) $y = \lvert x \rvert$
	
	g) $y = \frac{1}{x}$
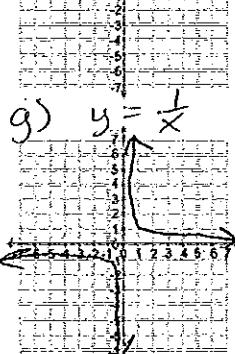
I can find the exact equation of a function given a locator point and another point.
Practice on LP worksheet.
  a. Parabola, vertex at (h,k), other point (x,y)
  b. Hyperbola, intersection of asymptotes (h,k), other point (x,y)
	a) Parabola, $(h,k) = (3,5)$ through $(2,2)$
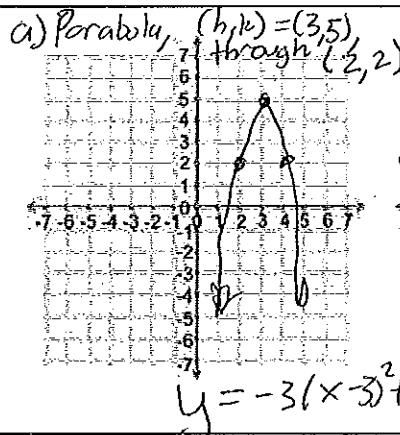	
	b) Hyperbola, $(h,k) = (-4,3)$ through $(-3,5)$
	
	$y = -3(x-3)^2 + 5$
	
	$y = \frac{2}{x+4} + 3$
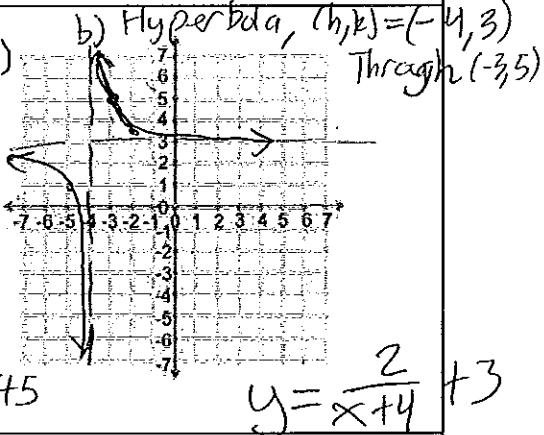
I can <u>translate</u> functions vertically and horizontally.
Given the function y=f(x),
  a. draw the graph of y=f(x)+k.
     i. What happens with k>0?
       k<0?   Shift up
       Shift down
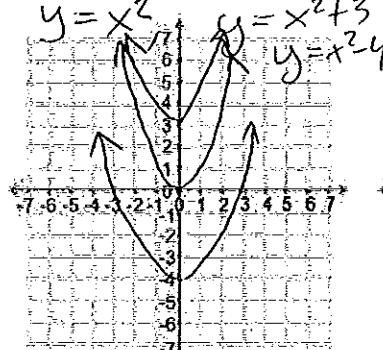 	
  b. draw the graph of y=f(x+k).
     i. What happens when k>0?
       k<0? Shift left
       Shift right
	$y = x^2$ $y = x^2 + 3$ $y = \sqrt{x}$, $y = \sqrt{x+2}$, $y = \sqrt{x-4}$
	$y = x^2 - 4$
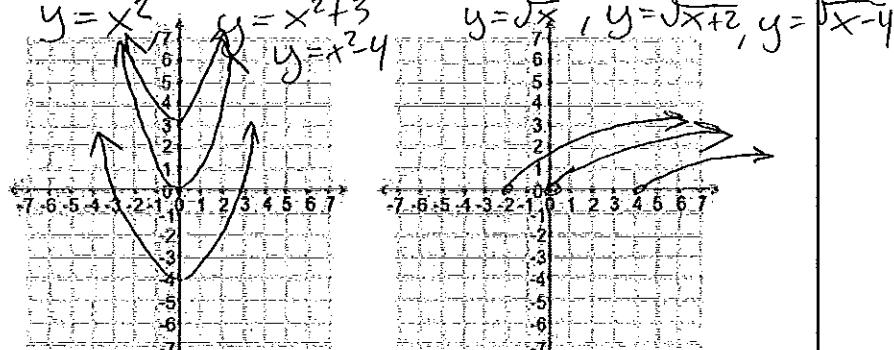
I can dilate functions vertically. Given the function y=g(x), a. draw the graph of y=kf(x). i. What happens with k<0? |k|<1? |k|>1?	$y=x^3$ $y=-x^3$ $y=\sqrt{x}, y=3\sqrt{x}$ $y=\frac{1}{2}\sqrt{x}$
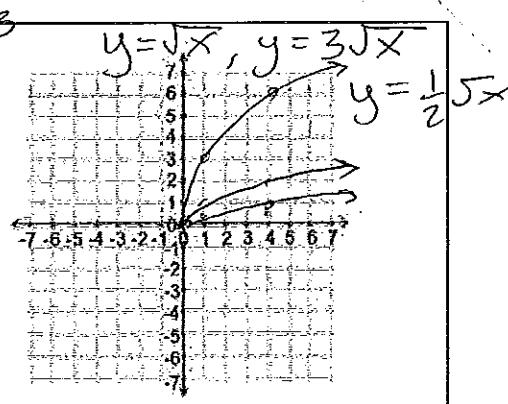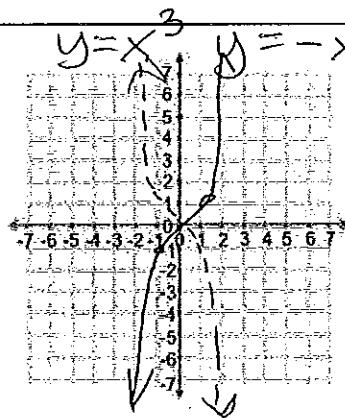
I can perform operations with polynomials. a. Factor quadratics including a>1, and difference of two squares b. Multiply factors using the distributive property	Factor x^2-7x-8 $(x-8)(x+1)$ $25x^2-9$ $(5x+3)(5x-3)$	Multiply $(3x+1)(x+2)$ $3x^2+7x+2$ $(7x-1)(7x+1)$ $49x^2-1$

I can Complete the Square to write a Quadratic Function in Graphing form. a. Write the function $p(x) = ax^2 + bx + c$ in graphing form and describe the transformations used to change the parent function $y = x^2$ to $p(x)$. b. Model quadratic situations using Graphing Form.	$y = x^2 - 4x + 1$ $y = (x-2)^2 - 3$ $V: (2, -3)$ Shift right 2 and down 3.

I can find the equation of a circle given a graph, or given a center (h,k) and radius r. $(x-h)^2 + (y-k)^2 = r^2$	radius = 3 center = 2, 3 $(x-2)^2 + (y-3)^2 = 9$
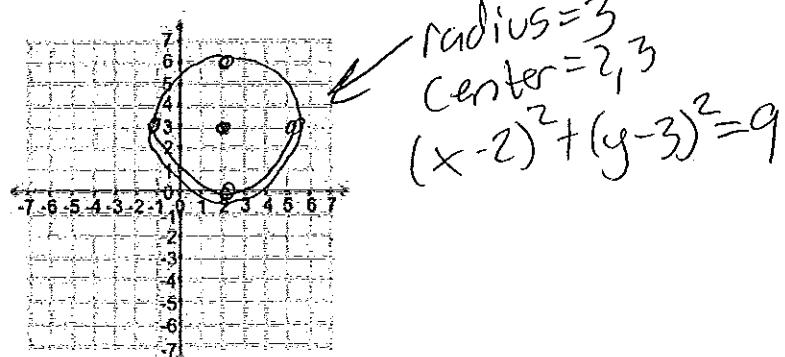
I can Complete the Square to change the equation of a circle into graphing form. $x^2+bx+y^2 + cy + d = f$	$x^2 + 14x + y^2 - 6y + 1 = 7$ $(x+7)^2 - 49 + (y-3)^2 - 9 + 1 = 7$ $(x+7)^2 + (y-3)^2 = 64$ Center: $(-7, +3)$, radius = 8