

1. Identify parent graph
2. Find transformed equation
3. Substitute (h,k) (x,y)
4. Solve for a

How to write equations from a graph and a statement:

A parabola that has a vertex at (1,1) that goes through the point (-4,76)

$$y = a(x-h)^2 + k$$

$$76 = a(-4-1)^2 + 1$$

$$75 = a(-5)^2$$

$$75 = \frac{25a}{25}$$

$$3 = a$$

$$y = 3(x-1)^2 + 1$$

Find the vertex and convert to vertex form

- completing the square

$$C = \left(\frac{b}{2}\right)^2$$

$$y = x^2 - 24x + 16$$

$$C = \left(\frac{-24}{2}\right)^2 = (-12)^2 = 144$$

$$y = (x^2 - 24x + 144) - 144 + 16$$

$$y = (x-12)^2 - 128$$

$$V = (12, -128)$$

Find the vertex and describe the transformation

sleeping parabola

$$x = (y+1)^2 - 3$$

$$\text{vertex} = (h, k) = (-3, -1)$$

Left 3, down 1

< or > 0 ≤ or ≥ 0

Piecewise Functions

$y = \begin{cases} x+3, & x \geq 1 \\ x^2, & -5 \leq x \leq 0 \end{cases}$ = Graph $y = x+3$, start at 1 and do all x values greater than or equal to 1.

Graph $y = x^2$ start at $x = -5$ and end at $x = 0$.

$a = -$ (negative)
Flip

$a > 1$ stretch
 $0 < a < 1$ compression

$+h = (x-h)$ right $+k$ up
 $-h = (x+h)$ Left $-k$ down

LT AA2 Cheat Sheet

Class Period:

Name: Mrs. Watson

Parent Equations	Transformed Equations	Sketch	Locator Point and Significance
Quadratic $y = x^2$	$y = a(x-h)^2 + k$		(h, k) is vertex
Square root $y = \sqrt{x}$	$y = a\sqrt{x-h} + k$		(h, k) starting point
Cubic $y = x^3$	$y = a(x-h)^3 + k$		(h, k) Point of Inflection
Cube root $y = \sqrt[3]{x}$	$y = a\sqrt[3]{x-h} + k$		(h, k) Point of Inflection
Absolute Value $y = x $	$y = a x-h + k$		(h, k) vertex
Circle $x^2 + y^2 = r^2$	$(x-h)^2 + (y-k)^2 = r^2$		Center = (h, k) r = radius
Sleeping Parabola $x = y^2$	$x = a(y-k)^2 + h$		(h, k) vertex, starting point

How to find x and y intercepts

x-intercept

$x, y = 0$

$$0 = \frac{1}{4}(x-5)^2 - 4$$

$$+4 \quad \quad \quad +4$$

$$4 = \frac{1}{4}(x-5)^2$$

$$\sqrt{\frac{1}{4}} \quad \sqrt{\frac{1}{4}}$$

$$\sqrt{16} = \sqrt{(x-5)^2}$$

$y-k = +k$ up $+h =$ right
 $y+k = -k$ down $-h =$ left

$$y = \frac{1}{4}(x-5)^2 - 4$$

$$4 = x - 5$$

$$+5 \quad +5$$

$$9 = x \quad (9, 0)$$

$$-4 = x - 5$$

$$+5 \quad +5$$

$$1 = x \quad (1, 0)$$

y-intercept, $x = 0$

$$y = \frac{1}{4}(0-5)^2 - 4$$

$$y = 2.25$$

$$(0, 2.25)$$