

Quadratic functions

Parent function $y = x^2$

linear
 $y = mx + b$
 $y - y_1 = m(x - x_1)$

Standard form
 $y = ax^2 + bx + c$

$a > 0$ opens upward
 $a < 0$ opens downward

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

x-intercepts root zeroes

two real roots
 one real root
 no real roots

x-coord. Vertex = $-b/2a$

stretch horizontal
 $y = a(x-h) + k$ vertical
 vertex (h, k)

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in terms of x, p and y

Set of all points
EQUIDISTANT
 from focus and directrix

(x, y) $(0, p)$ (x, y) $(3x+2)^2$

$y = -p$ $(0, 0)$ $y + p$ $(x, -p)$

$$(y+p)^2 = (\sqrt{(x-0)^2 + (y-p)^2})^2$$

$$y^2 + 2py + p^2 = x^2 + y^2 - 2py + p^2$$

$4py = x^2$ $y = \frac{1}{4p} x^2$

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