2.1 Quadratic Equations

(x^2)

Deg: 8

$3x^3y^5$

Polynomials: The sum of difference of one or more terms with real coefficients & non negative Exponents.

Ex: $3x^3 + 2xy - 4x^4 + 5y^5$

Deg: 3, 2, 4, 5

Degree of poly: The highest degree of an individual term in the polynomial.

Leading Coefficient: The coefficient in front of the term with the highest degree.

L.C.

$5y^5 - 4x^4 + 3x^3 + 2xy$

Deg: 5th deg

L.C.: 5

① $f(x) = 15x - 16x^4$

Deg: 4th

L.C.: -16

② $g(x) = -4x^5 + 3x^3 + \frac{x^7}{7}$

Deg: 7th

L.C: $\frac{1}{7}$

Vertex Form

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

Vertex: (h, k)

A.O.S.: $x = h$

opens up/down $\Rightarrow$ "a"

Standard Form

y-int

$y = ax^2 + bx + c$

A.O.S.: $x = \frac{-b}{2a}$

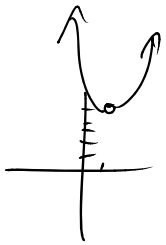
Vertex: $\left(\frac{-b}{2a}, \_\_\_\right)$

$g(x) = 3(x-1)^2 + 5$

Vertex: $(1, 5)$

A.o.s: $x = 1$

opens up



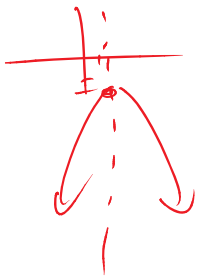
opens up/down determined by "a"

$f(x) = -3x^2 + 6x - 5$

A.o.s.: $x = \frac{-6}{2(-3)} = 1$

Vertex: $(1, -2)$

$a = -3$ opens down



Equation based on two points

① Vertex @ $(-2, -5)$

pt @ $(-4, 27)$

(x, y)

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

$27 = a(-4+2)^2 - 5$

$32 = a(4)$

$8 = a$

$y = 8(x+2)^2 - 5$

② Vertex @ $(4, -10)$

pt @ $(2, -14)$

$y = -(x-4)^2 - 10$

Vertex Form $\Longleftrightarrow$ Standard Form

Algebra

$(x+2)(x+2)$

$y = 8(x+2)^2 - 5 \Longrightarrow y = 8(x^2+4x+4) - 5$

$= 8x^2+32x+32-5$

$y = 8x^2+32x+27$

Completing the square

$y = (x^2+6x)+1 \Longleftarrow y = x^2+6x+1$

$= (x^2+6x+\underline{9}) - \underline{9} + 1$

$\div 2 \downarrow$

$y = (x+3)^2 - 8$

$y = (4x^2+24x) - 3 \Longleftarrow y = 4x^2+24x-3$

$= 4(x^2+6x+\underline{9}) - \underline{36} - 3$

$\div 2 \downarrow$

$y = 4(x+3)^2 - 39$

$\frac{-24}{2(4)} = -3$

Vertex: $(-3, -39)$

A.o.s: $x = -3$

Open up

$5x^2+12x$