

3 Forms of a Quadratic Function

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

① $f(x) = x^2 + 6x + 5$

② $f(x) = -4x^2 + 16x - 12$

What do I know? What is important

- easily find the y-int = c
- direction if $a = + \uparrow$
 $a = - \downarrow$ determines width
- use a box + diamond to put in factored form to find roots/x-int
- vertex can be found with $-\frac{b}{2a}$

Factored form: $y = a(x-p)(x-q)$

① $f(x) = (x+5)(x+1)$

② $f(x) = -4(x-1)(x-3)$

- easily find the x-intercepts/roots using zero product property
- direction if $a = + \uparrow$
 if $a = - \downarrow$ width
- Can get back to standard form with a box or foil
 product \Rightarrow sum $\begin{array}{|c|c|} \hline x & \\ \hline +5 & +1 \\ \hline \end{array}$
- find y-int by substituting 0 for x

Vertex/Graphing form:

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

① $f(x) = (x+5)(x+1)$

$f(x) = (x+3)^2 - 4$

② $f(x) = -4(x-2)^2 + 4$

- h = horizontal shift
- k = vertical shift

- can easily find the vertex! (h,k)
 what number for x makes the () go to 0?
 ex1) (-3, -4) ex2) (2, 4)
- can find y-int by substituting 0 for x.
- same a-values if $a = + \uparrow$ width
 if $a = - \downarrow$
- convert to standard form by expanding ()² and evaluating.
 $(x+3)(x+3) - 4$