

Wed-Thurs

4.5 Graphing in Standard Form Notes

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

y-intercept: $(0, c)$

To find the Vertex:

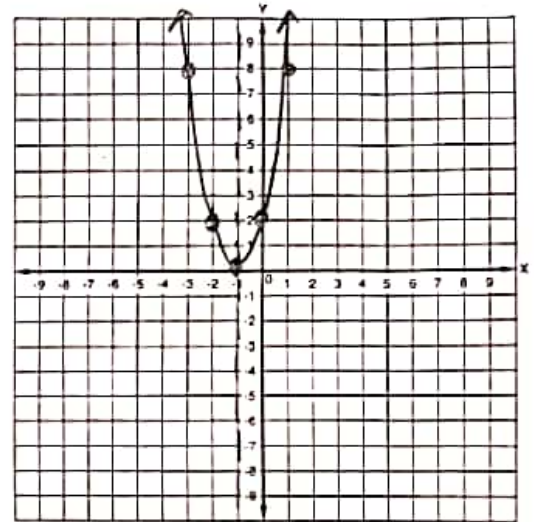
1. Find $-\frac{b}{2a}$. This is the x-value of the vertex.
2. To find the y-value of the vertex, plug in the x-value.

Example: $y = 2x^2 + 4x + 2$

Vertex: $-\frac{4}{2 \cdot 2} = -1$
 $2(-1)^2 + 4(-1) + 2$
 $2 - 4 + 2 = 0$

y-intercept: $(0, 2)$

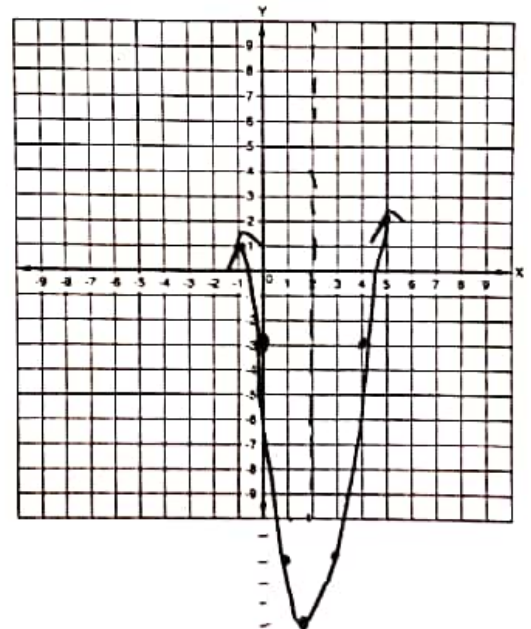
Other point: $2(1)^2 + 4(1) + 2$
 $2 + 4 + 2 = 8$
 $(1, 8)$



Example: $f(x) = 3x^2 - 12x - 3$

Vertex: $\frac{+12}{2(3)} = 2$
 $3(2)^2 - 12(2) - 3$
 $12 - 24 - 3$
 $= -12 - 3$

y-intercept: $(0, -3)$



Example: Rewrite in factored form and vertex form. Then find the following key features and graph.

$$f(x) = x^2 + 6x - 16$$

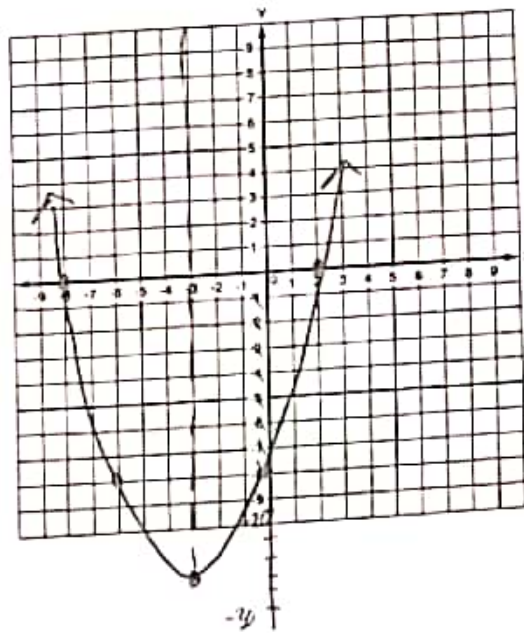
Factored form: $(x+8)(x-2)$

Vertex Form: $x^2 + 6x + [9] - 16 - 9$
 $(x+3)^2 - 25$

Vertex: $(-3, -25)$

X-intercepts: $(-8, 0)$ $(2, 0)$

Y-intercept: $(0, -16)$



Example: Rewrite in factored form and vertex form. Then find the following key features and graph.

$$f(x) = x^2 + 4x - 5$$

Factored form: $(x+5)(x-1)$

Vertex Form: $x^2 + 4x + [4] - 5 - 4$
 $(x+2)^2 - 9$

Vertex: $(-2, -9)$

X-intercepts: $(-5, 0)$ $(1, 0)$

Y-intercept: $(0, -5)$

