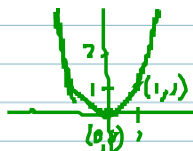


Quadratic Functions: Standard form (AKA Vertex form)

$$f(x) = x^2$$

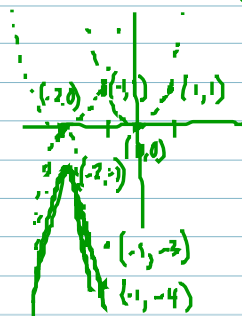


Vertex at $(0,0)$ is the relative (and absolute) minimum

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

$$g(x) = -3f(x+2) - 1$$

Shift the graph of f left by 2, flip upside-down, stretch vertically by a factor of 3, shift down by 1.

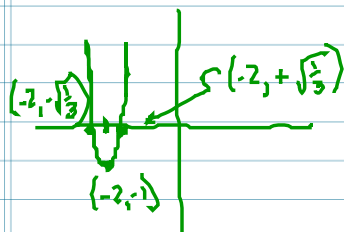


Vertex at $(-2, -1)$

Another point: $(-1, -4)$

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

x -intercepts:



$$g(x) = 0 \quad 3(x+2)^2 - 1 = 0$$

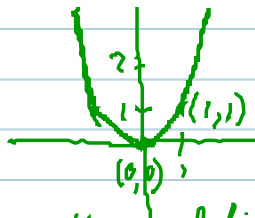
$$(x+2)^2 = \frac{1}{3}$$

$$x+2 = \pm \sqrt{\frac{1}{3}}$$

$$x = -2 \pm \sqrt{\frac{1}{3}}$$

Quadratic Functions: Standard form (AKA Vertex form)

$$f(x) = x^2$$

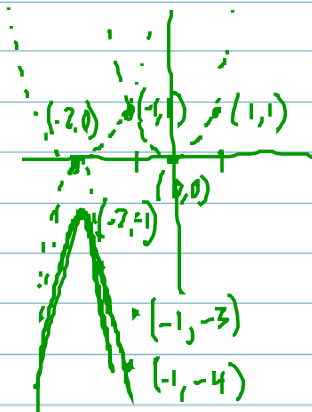


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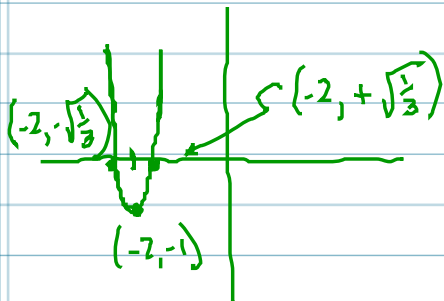


Vertex at $(-2, -1)$

Another point: $(-1, -4)$

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

x -intercepts:



$$g(x) = 0 \quad 3(x+2)^2 - 1 = 0$$

$$(x+2)^2 = \frac{1}{3}$$

$$x+2 = \pm \sqrt{\frac{1}{3}}$$

$$x = -2 \pm \sqrt{\frac{1}{3}}$$