

7/19/2026

Rule 1:

For a single quadratic  $y = ax^2 + bx + c$ , the equation for the line from the vertex to the y-intercept is

$$y = \frac{b}{2}x + c$$

Rule 2:

For a single quadratic  $y = ax^2 + bx + c$  the equation for the line from the vertex to the origin is

$$y = \left( \frac{b}{2} - \frac{2ac}{b} \right)x$$

# Rule 1 proof (revised)

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1.  $x:y$  ratio of vertex

$$-\frac{b}{2a} : -\frac{b^2}{4a}$$

$$\frac{1}{2a} : \frac{b}{4a}$$

$$\frac{1}{a} : \frac{b}{2a}$$

$$1 : \frac{b}{2}$$

$$m = \frac{b}{2}$$

2.  $y$ -int moves up by  $c$  as vertex  
moves up by  $c$ , so

$$y = mx + c$$

↓

$$y = \frac{b}{2}x + c$$

Rule

2 proof

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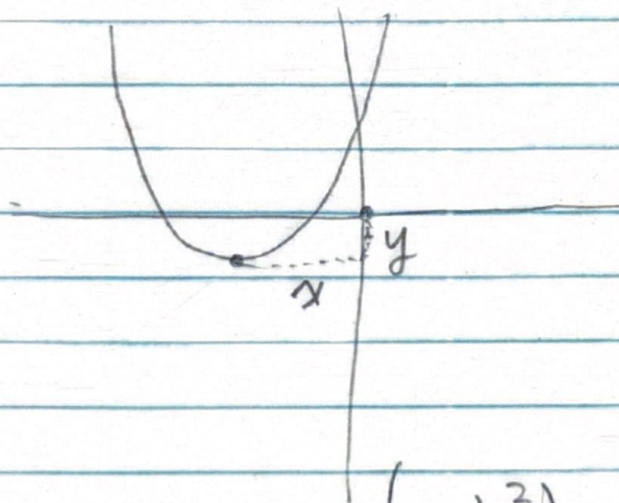
$$m = \left( c - \frac{b^2}{4a} \right) \left( -\frac{2a}{b} \right)$$

$$= -\frac{2ab^2}{4ab} + \frac{2ac}{b}$$

$$= -\frac{b}{2} + \frac{2ac}{b}$$

For vertex to origin:

$$y = \left( \frac{b}{2} - \frac{2ac}{b} \right) x$$



0,0 has no  
"+c" in a equation,  
so the linear  
equation is in  
 $y = mx$  form.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\left( c - \frac{b^2}{4a} \right) - 0}{-\frac{b}{2a} - 0}$$

$$= \left( c - \frac{b^2}{4a} \right) \left( -\frac{2a}{b} \right)$$