objective: To graph quadratics in intercept or factored form. $y = a(x-p)(x-q)$

☆ $x^2 - 3x - 28$ factor : standard form → factored form

$x \times x$; -7, 4

$4x - 7x = -3x$?

$(x - 7)(x + 4)$

$y = a(x-p)(x-q)$ (opp sign, opp sign)

1.) x-intercepts : $(p, 0), (q, 0)$

2.) axis of symmetry : halfway between p and q

$$x = \frac{p+q}{2}$$

3.) vertex : plug $x = \frac{p+q}{2}$ back into original problem to find y-coordinate.

4.) helper points : use $\frac{a}{1}$ as a $\frac{\text{rise}}{\text{run}}$ on both sides of vertex.

5.) y-intercept : plug in zero for x and solve for y.

Example 1: We do

$$y = -2(x+1)(x-3)$$

1.) $(-1, 0)\ (3, 0)$

2.) $x = \frac{-1+3}{2} = \frac{2}{2} = 1$

$x = 1$

3.) $y = -2(1+1)(1-3)$

$y = -2(2)(-2)$

$y = (-4)(-2)$ $\quad (1, 8)$

$y = 8$

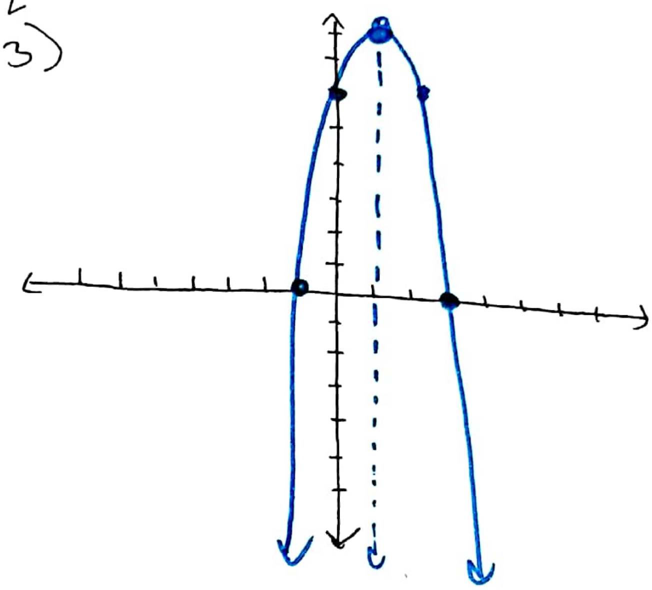
4.) helper points: $\frac{-2}{1}$

5.) y-intercept: $y = -2(0+1)(0-3)$

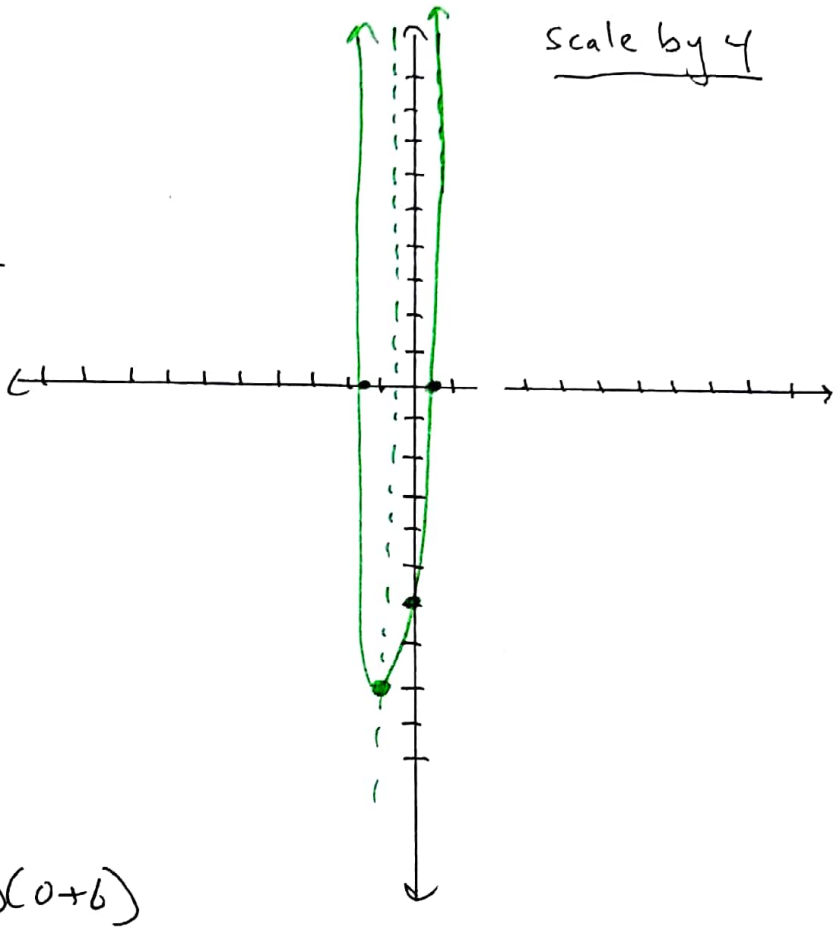
$y = -2(1)(-3)$

$y = -2(-3)$ $\quad (0, 6)$

$y = 6$



Example 2: $y = 2(x-2)(x+6)$ you do



1.) $(2,0), (-6,0)$

2.) $x = \frac{2+-6}{2} = \frac{-4}{2} = -2$

$x = -2$

3.) $y = 2(-2-2)(-2+6)$

$y = 2(-4)(4)$

$y = -8(4) = -32$

$(-2, -32)$

5.) y-int: $y = 2(0-2)(0+6)$

$y = 2(-2)(6)$

$y = -4(6)$

$y = -24 \quad (0, -24)$