

W/S AA4-18 Parabola Formats

The equation of a parabola can be written in any of three formats:

STANDARD FORM: $y = ax^2 + bx + c$

FACTORED FORM: $y = a(x - x_1)(x - x_2)$

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

of Solutions with
 $y = 2x - 8$ &
 $y = -3x + 10$

1) Convert from STANDARD FORM to FACTORED FORM by factoring the equation.

STANDARD FORM \longrightarrow **FACTORED FORM**

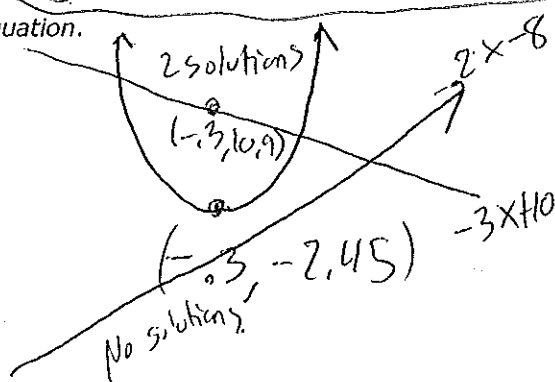
$y = 5x^2 + 3x - 2$

$h = -\frac{b}{2a} = -\frac{3}{2(5)} = -\frac{3}{10} = (-.3)$

$y = 5(-.3)^2 + 3(-.3) - 2 = (-2.45)$

$y = 2(-.3) - 8 = (-8.6)$

$y = -3(-.3) + 10 = (10.9)$



2) Convert from STANDARD FORM to VERTEX FORM by finding the vertex $(-b/2a)$, then using the same "a" value.

STANDARD FORM \longrightarrow **VERTEX FORM**

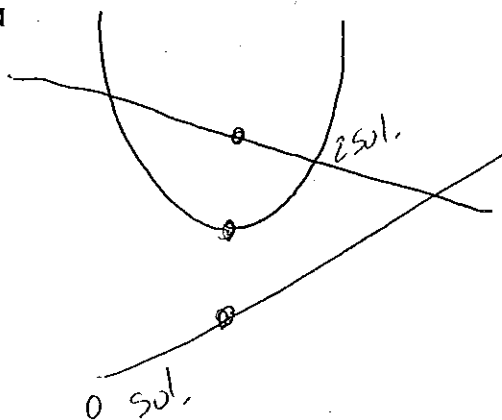
$y = 2x^2 - 6x + 1$

$h = -\frac{(-6)}{2(2)} = \frac{6}{4} = 1.5$

$2(1.5)^2 - 6(1.5) + 1 = (-3.5)$ Mid

$2(1.5) - 8 = (-5)$ Low

$-3(1.5) + 10 = (5.5)$ Hi



3) Convert from FACTORED FORM to STANDARD FORM by algebraically multiplying out the factors.

FACTORED FORM \longrightarrow **STANDARD FORM**

$y = 3(x - 2)(x + 7)$

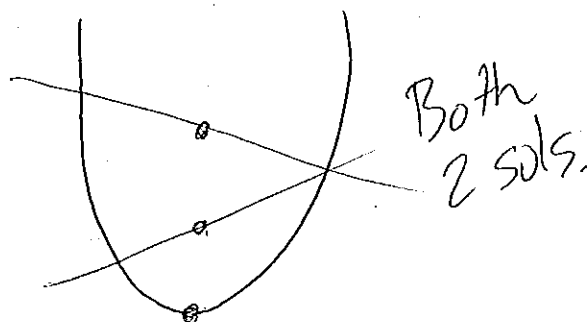
$x = 2, x = -7$

$h = \frac{2 + (-7)}{2} = -\frac{5}{2} = -2.5$

$3(-2.5 - 2)(-2.5 + 7) = (-60.75)$ Low

$2(-2.5) - 8 = -5 - 8 = (-13)$ Mid

$-3(-2.5) + 10 = (17.5)$ Hi



4) Convert from FACTORED FORM to VERTEX FORM by finding the vertex (midpoint of x-intercepts), then using the same "a" value.

FACTORED FORM

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

$$x = -3, x = 1$$

$$h = \frac{-3+1}{2} = \frac{-2}{2} = -1$$

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

$$-2(2)(-2) = 8$$

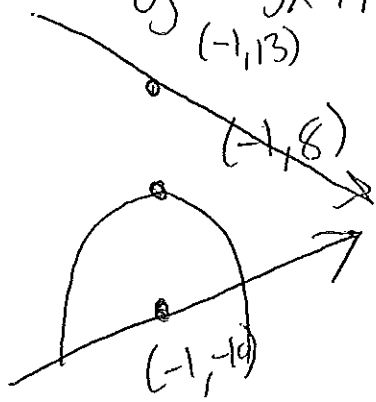
$$2(-1) - 8 = -10$$

$$-3(-1) + 10 = 13$$

VERTEX FORM

$$y = 2x - 8$$

$$y = -3x + 10$$



5) Convert from VERTEX FORM to STANDARD FORM by algebraically multiplying out the equation.

VERTEX FORM

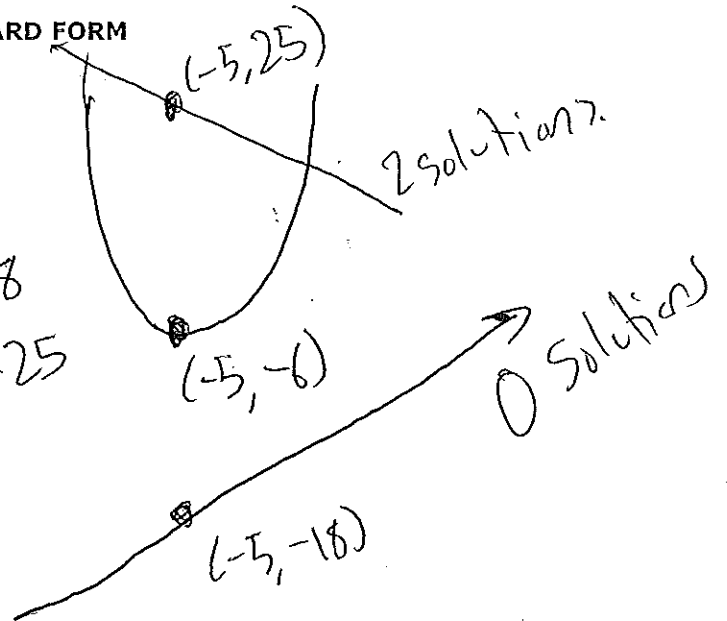
$$y = 2(x+5)^2 - 6$$

STANDARD FORM

$$V: (-5, -6)$$

$$y = 2x - 8 \rightarrow 2(-5) - 8 = -18$$

$$y = -3x + 10 \rightarrow -3(-5) + 10 = 25$$



2 solutions

0 solutions

6) Convert from VERTEX FORM to FACTORED FORM. There is no way to go directly from Vertex Form to Factored Form. We need to combine the process in #5 to create a Standard Form equation, then follow the process in #1.

VERTEX FORM

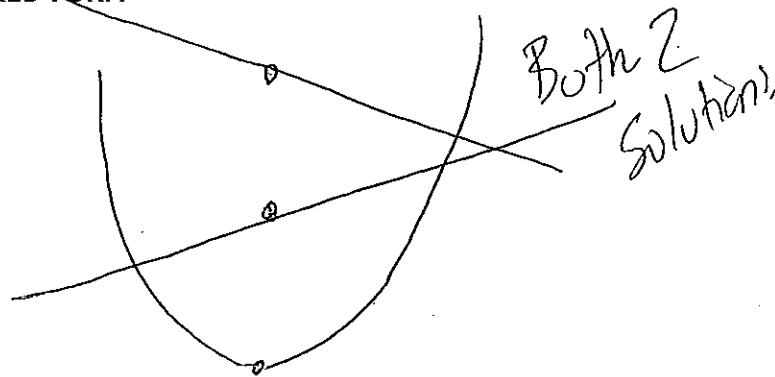
$$y = (x-2)^2 - 25$$

FACTORED FORM

$$V: (2, -25)$$

$$2(2) - 8 = -4$$

$$-3(2) + 10 = 4$$



Both 2 solutions