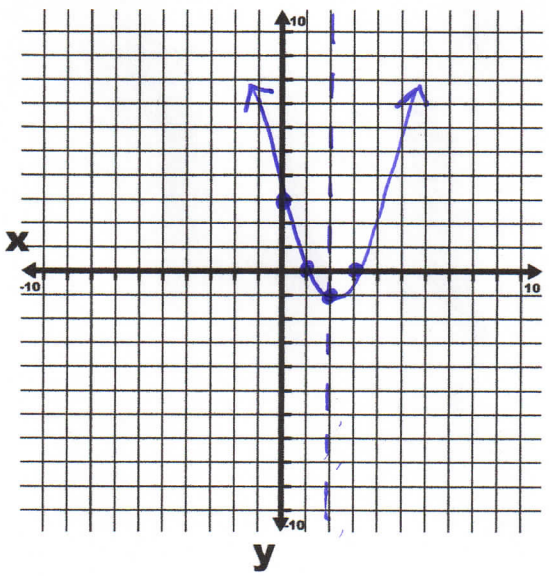
QUADRATIC RELATIONS: Standard Form Continued....Date: Notes

EXAMPLES: Complete all the information in the table for the following equations and graph .

a) $y = x^2 - 4x + 3$

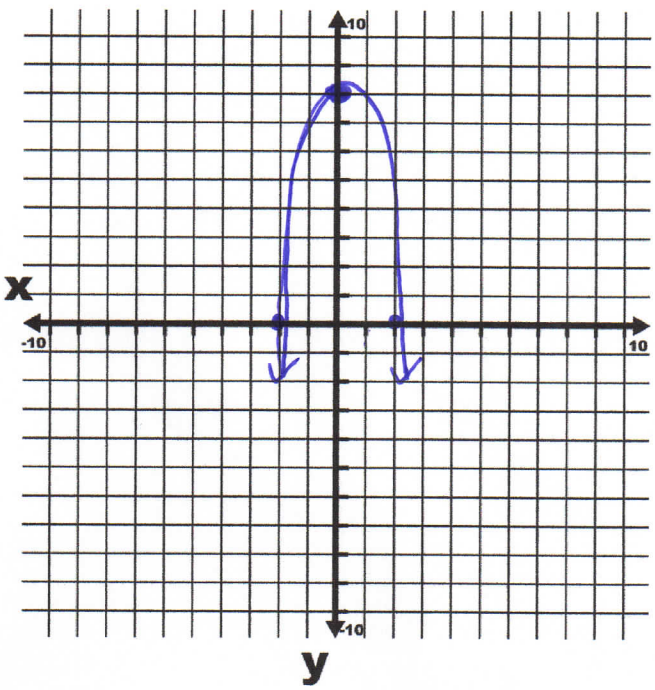
Key Feature	Steps to Find Key Feature	Solution
y-intercept	**1.** Look for the "c" value	y-int = 3
Zeros	**1.** Factor (look for common factor 1st! **2.** Set each factor to zero **3.** Solve for the x's	$y = (x-1)(x-3)$ $0 = (x-1)(x-3)$ $x-1=0$ $\quad$ $x-3=0$ $x=1$ $\quad$ $x=3$ ∴ x-int are 1 and 3.
Axis of Symmetry	**1.** Add the x-intercept values and divide by 2	$\frac{1+3}{2} = \frac{4}{2} = 2$ ∴ aos is $x=2$
Vertex	**1.** Substitute x-value from axis of symmetry into the equation and find value of y	Let $x=2$, $y = x^2 - 4x + 3$ $y = (2)^2 - 4(2) + 3$ $y = 4 - 8 + 3$ $y = -4 + 3$ $y = -1$ ∴ vertex $(-1, 2)$
Direction of Opening	**1.** Opens up if "a" is positive. Opens down if "a" is negative.	up
Max/Min Value	**1.** Max value if opens down and min value if opens up (max/min value is always the y-value of the vertex)	min value = -1



QUADRATIC RELATIONS: Standard Form Continued....Date: Notes

b) $y = -2x^2 + 8$

Key Feature	Solution
y-intercept	y-int = 8
Zeros	$y = -2(x^2 - 4)$ $y = -2(x-2)(x+2)$ $x = 2$ and $x = -2$
Axis of Symmetry	$\frac{2 + (-2)}{2} = \frac{0}{2} = 0$
Vertex	Let $x = 0$, $y = -2x^2 + 8$ $y = -2(0)^2 + 8$ $y = 0 + 8$ $y = 8$ $\therefore$ vertex $(0, 8)$
Direction of Opening	down
Max/Min Value	max value of 8.



c) $y = 2x^2 - 4x - 6$

Key Feature	Solution
y-intercept	$y = -6$
Zeros	$y = 2(x^2 - 2x - 3)$ $0 = 2(x-3)(x+1)$ $x = 3$ $x = -1$
Axis of Symmetry	$\frac{3 + (-1)}{2} = \frac{2}{2} = 1$
Vertex	Let $x = 1$, $y = 2x^2 - 4x - 6$ $y = 2(1)^2 - 4(1) - 6$ $y = 2 - 4 - 6$ $\therefore (1, -8)$ $y = -8$
Direction of Opening	up
Max/Min Value	min value $= -8$