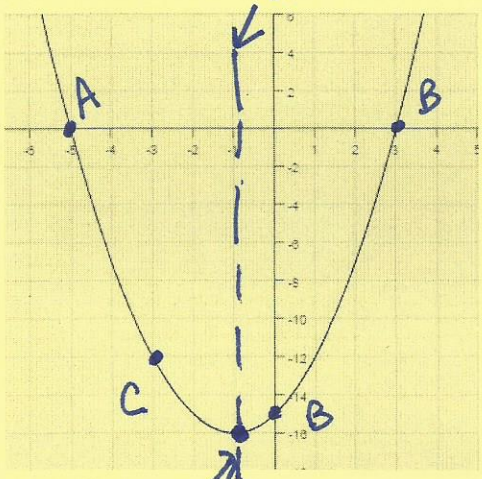
Algebra 2: Unit 3 Quadratics Study Guide

Name: Key

1. Use the graph of the quadratic function y = f(x) given below.



Write the coordinates of the point(s) that are solutions to f(x) = 0. **Label** them on the graph as "A."	Solutions are X-intercepts ($y=0$) $x=-5$ and $x=3$.
Write the coordinates of the y-intercept(s). **Label** them on the graph as "B."	$(0,-15)$
Write the coordinates of another point that is a solution to y = f(x). **Label** it on the graph as "C."	$(-3,-12)$ Any point on the graph
Draw the line of symmetry and **write** the equation:	$x=-1$ axis of symmetry
Label the maximum/minimum and **write** the coordinate:	$(-1,-16)$
Describe the end behavior:	As $x \to +\infty$, $f(x) \to +\infty$ As $x \to -\infty$, $f(x) \to +\infty$
Increasing interval	$[-1, +\infty)$
Decreasing interval	$(-\infty, -1]$
Domain	$(-\infty, +\infty)$
Range	$[-16, +\infty)$

b. Write the equation for the graph above in **Vertex form** and in **Standard form**.

$a=1$ vertex $(-1,-16)$ (h, k)

$f(x) = a(x-h)^2 + k$

$f(x) = 1(x+1)^2 - 16$ ← vertex form

$f(x) = (x+1)^2 - 16$

$= (x+1)(x+1) - 16$

$= x^2 + x + x + 1 - 16$

$f(x) = x^2 + 2x - 15$ ↑ standard form

2. Write in vertex form by completing the square. Find the vertex and the y-intercept.

a) $y = x^2 - 4x - 10$

y-intercept $(0, c)$ $(0, -10)$

$y = x^2 - 4x - 10$

$b = -4$ / $\frac{b}{2} = \frac{-4}{2} = -2$ / $(-2)^2 = 4$

$x^2 - 4x = 10$

$+4 \quad +4$

$x^2 - 4x + 4 = 14$

$(x-2)^2 = 14$

vertex form

vertex (h, k)

$f(x) = (x-2)^2 - 14$

vertex $(2, -14)$

b) $y = x^2 + 6x - 8$

y-intercept $(0, -8)$

$y = x^2 + 6x - 8$

$b = 6$ / $\frac{b}{2} = \frac{6}{2} = 3$ / $3^2 = 9$

$x^2 + 6x = 8$

$+9 \quad +9$

$x^2 + 6x + 9 = 17$ $\left(x + \frac{b}{2}\right)^2$

$(x+3)^2 = 17$

$x + 3 = \pm\sqrt{17}$ → $x = -3 \pm \sqrt{17}$