**Worksheet 2.1A, Quadratic functions**
MATH 1410,
(SOLUTIONS)

1. Find the quadratic function with the given vertex and point. Put your answer in **vertex** form, **except for g)**.

   (a) Vertex $(0,0)$ passing through $(-2, 8)$.   (b) Vertex $(2, 0)$ passing through $(1, 3)$.

   (c) Vertex $(-3, 0)$ passing through $(-5, -4)$.   (d) Vertex $(0, 1)$ passing through $(-1, 0)$.

   (e) Vertex $(2, 5)$ passing through $(3, 7)$.   (f) Vertex $(-3, 4)$ with y-intercept of 0.

   (g) has x-intercepts of -8 and -2 that goes through the point (3 ,-9).

Solutions.

   (a) A parabola with vertex $(0,0)$ passing through $(-2, 8)$ has equation $\boxed{y = 2x^2.}$

   (b) A parabola with vertex $(2,0)$ passing through $(1, 3)$ has equation $\boxed{y = 3(x-2)^2.}$

   (c) A parabola with vertex $(-3,0)$ passing through $(-5, -4)$ has equation $\boxed{y = -(x+3)^2.}$

   (d) A parabola with vertex $(0,1)$ passing through $(-1, 0)$ has equation $\boxed{y = -x^2 + 1.}$

   (e) A parabola with vertex $(2,5)$ passing through $(3, 7)$ has equation $\boxed{y = 2(x-2)^2 + 5.}$

   (f) A parabola with vertex $(-3,4)$ passing through $(0, 0)$ has equation $\boxed{y = -\dfrac{4}{9}(x+3)^2 + 4.}$
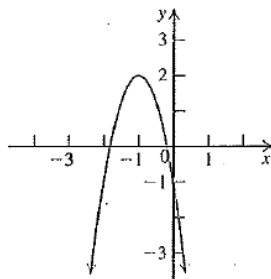
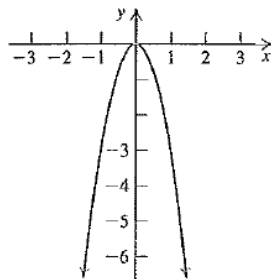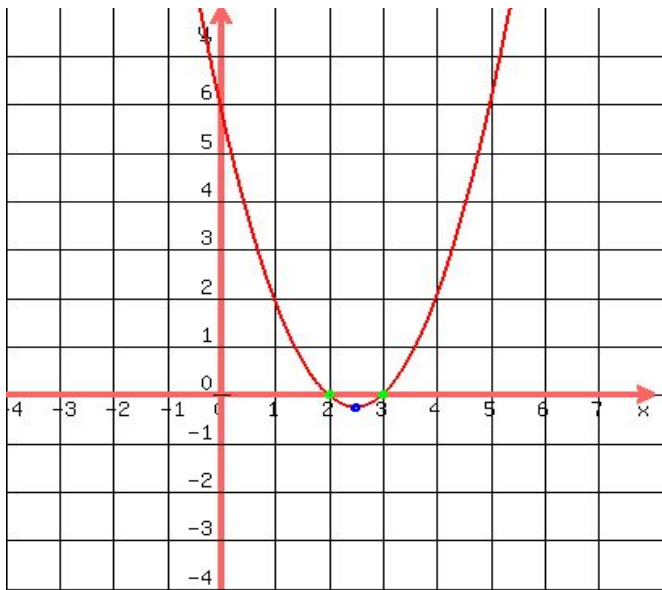4 Find the equation for the parabolas below. Put your answers in standard
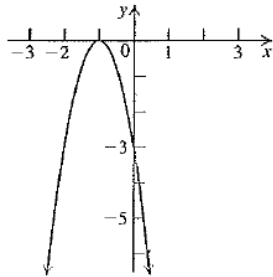
(a)
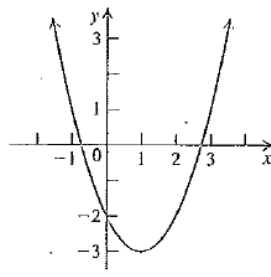
(b)

(c)

(d)

Solutions.

(a) Since the parabola has x-intercept at $x = -1$, with multiplicity 2, then it must be of the form $y = a(x+1)^2$. Since it goes through $(0, -3)$ the equation is $\boxed{y = -3(x+1)^2}$.

(b) The zeroes seem to be about 2.7 and -0.7 with vertex at $(1, -3)$. The standard form for this parabola must be something like $f(x) = a(x-1)^2 - 3$. In this case, $a = 1$ works perfectly well so the equation is $\boxed{y = (x-1)^2 - 3.}$

(c) The vertex is at $(-1, 2)$ so the quadratic has form $f(x) = a(x+1)^2 + 2$. Since the parabola goes through $(0, -1)$, a must be -3. So the equation is $\boxed{y = -3(x+1)^2 + 2.}$

(d) The vertex is at $(0, 0)$ so the quadratic has form $f(x) = ax^2$. It appears that a is about -3 since the parabola probably goes through $(1, -3)$. So the equation is $\boxed{y = -3x^2.}$