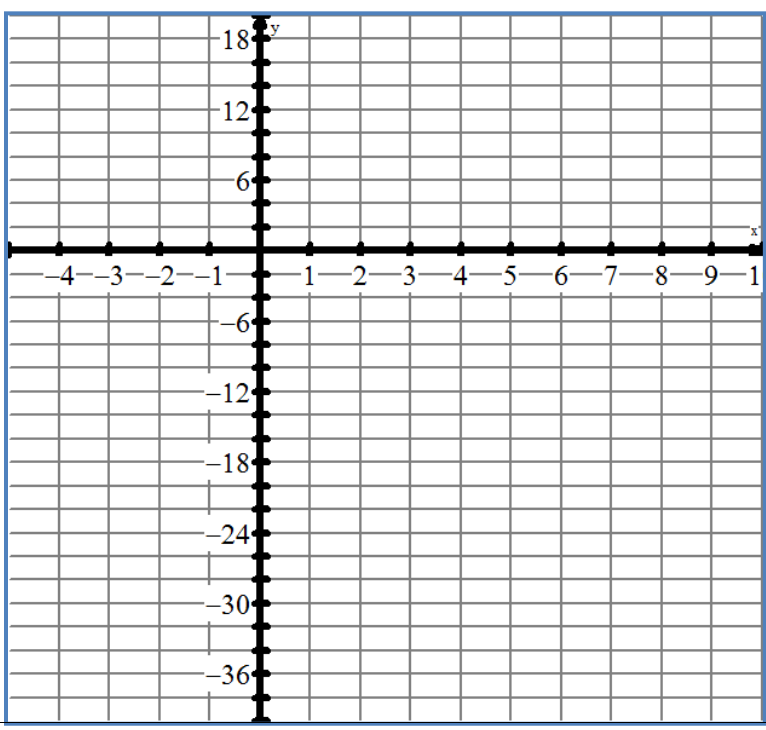
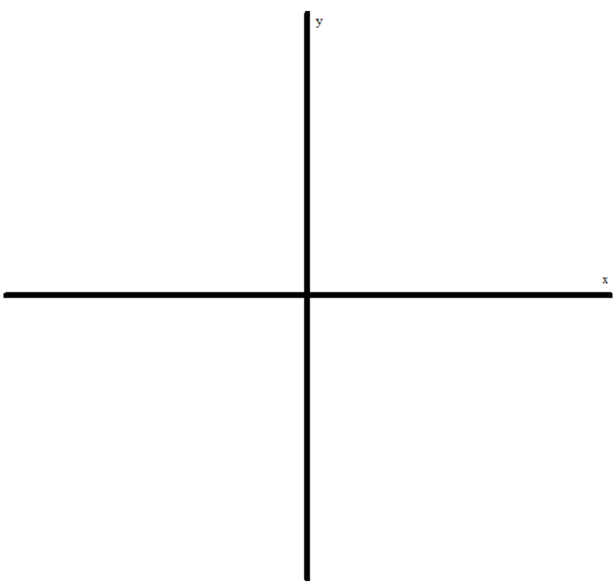
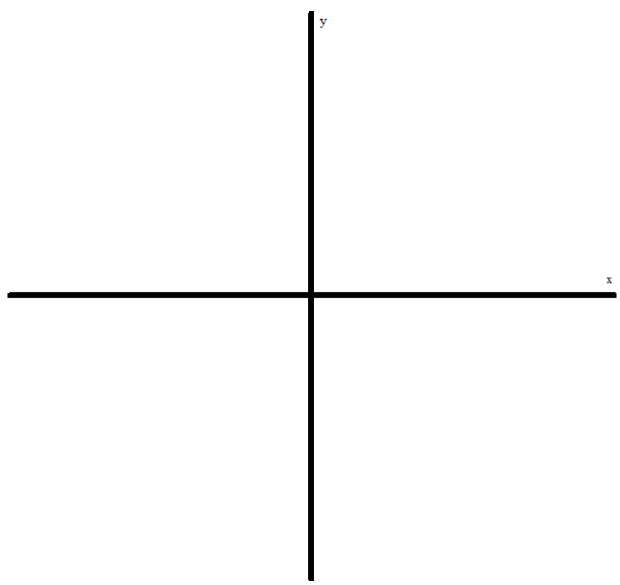
(A) Review – Forms of Quadratic Equations

<table>
<tr><th>Standard Form:
$f(x) = 2x^2 - 8x - 24$</th><th>Intercept Form:
$f(x) = 2(x - 6)(x + 2)$</th><th>Vertex Form:
$f(x) = 2(x - 2)^2 - 32$</th></tr>
<tr><td>Analysis:
Determine the y-intercept of f(x)</td><td>Analysis:
Determine the zeroes of f(x)

Determine the eqn of the axis of symmetry of f(x)</td><td>Analysis:
Determine the vertex of f(x)</td></tr>
<tr><td>Algebra:
Factor f(x)</td><td>Algebra:
Expand and simplify f(x)</td><td>Algebra:
Expand and simplify f(x)</td></tr>
<tr><td colspan="2">Graphic: Sketch f(x) given the results of your analysis and algebraic workings.
</td><td>Further Analysis – Transformations:

Explain how the parabola $y = 2x^2$ has been transformed so that its equation now is $y = 2(x - 2)^2 - 32$</td></tr>
</table>

(B) Working with Quad. Eqns in Vertex Form – Algebraic Examples

Example #1: Find the vertex, axis of symmetry & the direction of opening for $g(x) = -\frac{1}{2}(x-5)^2 + 8$.	Example #2: Find the vertex, axis of symmetry & the direction of opening for $h(t) = 2(t-3)^2 - 7$.
Find the y-intercept of g(x)	Find the y-intercept of h(t)
Find the x-intercepts of g(x)	Find the x-intercepts of h(t)
Find another point of g(x)	Find another point of h(t)
Sketch g(x) and label the key points. 	Sketch h(t) and label the key points. 

(C) Working with Quad. Eqns in Vertex Form – Algebraic Examples

Example 3: A parabola has a maximum point g(-2) = 10 and additionally g(0) = 2.

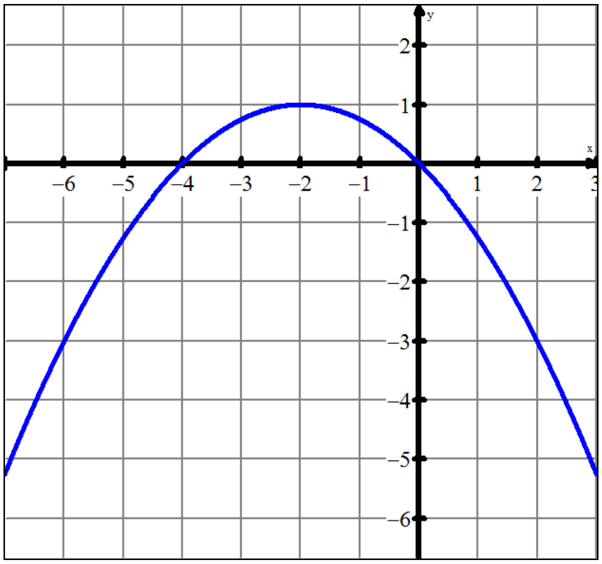
(a) Which direction does the parabola open?

(b) How do you know?

(c) Determine the equation of this parabola.

(d) Explain how you could verify that your equation is correct.

Example 4: Determine the equation of the parabola given in the following graph.



(a) Show your working here.

(d) Explain how you could verify that your equation is correct.

Example 5: A quadratic function has g(0) = -4 and g(2) = 0 and g(-4) = 0. Determine the equation of g(x) in vertex form.

(D) Solving Quadratic Equations in Vertex Form

Algebraic: Solve $(x - 4)^2 = 9$ Graphic: Use your TI-84 to graph the SYSTEM/EQN and then EXPLAIN the graphic significance of the original eqn.	Algebraic: Solve $(x - 4)^2 = 0$ Graphic: Use your TI-84 to graph the SYSTEM/EQN and then EXPLAIN the graphic significance of the original eqn.
Algebraic: Solve $(x - 4)^2 - 16 = 0$ Graphic: Use your TI-84 to graph the SYSTEM/EQN and then EXPLAIN the graphic significance of the original eqn.	Algebraic: Solve $\frac{1}{2}(x - 4)^2 - 18 = 0$ Graphic: Use your TI-84 to graph the SYSTEM/EQN and then EXPLAIN the graphic significance of the original eqn.
Algebraic: Solve $(x - 2)^2 - 5 = 0$ Graphic: Use your TI-84 to graph the SYSTEM/EQN and then EXPLAIN the graphic significance of the original eqn.	Algebraic: Solve $(x - 1)^2 + 3 = 0$ Graphic: Use your TI-84 to graph the SYSTEM/EQN and then EXPLAIN the graphic significance of the original eqn.

(E) Working with Quad. Eqns in Vertex Form – Applications.

Mr. S. has determined that student marks tend to follow a parabolic trend which he has modelled using the equation $P(m) = -\frac{1}{2}(m - 4)^2 + 90$. The independent variable is ***m*** and represents the number of months since the beginning of August; i.e. if $m = 2$, then that represents Oct 1 and so $m = 5$ represents now (Jan 1). The dependent variable, ***P***, represents the student's average as a percentage. (NO TI-84 for this Q)

a. Determine the student's average at the beginning of the school year.

b. Determine the student's maximum mark and when the maximum mark occurred.

c. What is the student's predicted final grade on June 1?

d. ALGEBRAICALLY solve and then interpret the equation $88 = -\frac{1}{2}(\mathbf{m} - 4)^2 + 90$

e. Explain WHY a quadratic model COULD BE appropriate for showing the change in student marks over an entire school year.

(F) Homework: Nelson 10; Chap 4.2, p351, Q2cf, 3ef, 5ab, 7d, 9e, 10c, 11, 13, 21