Module 2 Review

Name Key

1. Write the Standard form of a quadratic equation

$y = ax^2 + bx + c$

2. Write the factored form of a quadratic equation

$y = (x \pm \#)(x \pm \#)$

3. Write the vertex form of a quadratic equation

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

4. Given the equation in standard form, find the factored form and vertex form.

$x^2 + 5x - 24$

$-24x^2$: $8x$, $-3x$; $5x$

	x	-3
x	x^2	$-3x$
$+8$	$8x$	-24

Factored form: $(x+8)(x-3)$

$x^2 + 5x - 24$

$\frac{5}{2} = 2.5$, $(2.5)^2 = 6.25$

$x^2 + 5x + 6.25 \quad -24 - 6.25$

Vertex Form: $(x+2.5)^2 - 30.25$

5. Given the equation in vertex form, find the equation in standard form

$2(x+2)^2 - 4 \longrightarrow 2(x+2)(x+2) - 4$

$= (2x+4)(x+2) - 4$

$= 2x^2 + 4x + 4x + 8 - 4$

$= 2x^2 + 8x + 4$

Standard Form: $2x^2 + 8x + 4$

6. Given an equation in factored form, find the standard form and vertex form. Then make a table and graph.

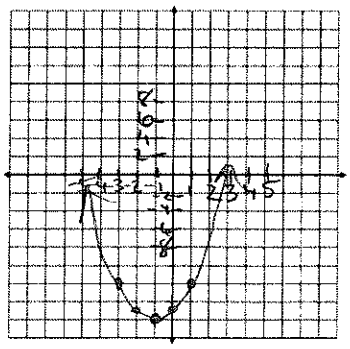
a. *Standard Form*	b. *Vertex Form*	c. *Factored Form*
$x^2 + 2x - 15$	$(x+1)^2 - 16$	$y = (x+5)(x-3)$

d. *Table* (Include the vertex and at least 2 points on each side of the vertex.)

x	y
-3	-12
-2	-15
-1	-16
0	-15
1	-12

Show the first differences and the second differences.

e. *Graph*



Factor the left side of two equation to show they are equal.

7. Multiply out the right side of ~~each~~ two equation to show that it is equal to the left side.

$x^2 + 12x - 64 = (x + 16)(x - 4)$

$-64x^2$, $16x$, $-4x$, $+4x$

	x	-4
x	x^2	$-4x$
$+16$	$16x$	-64

$(x+16)(x-4)$

$x^2 - 64 = (x + 8)(x - 8)$

$= x^2 - 8x + 8x - 64$

$= x^2 - 64$

$x^2 + 20x + 64 = (x + 16)(x + 4)$

$64x^2$, $16x$, $4x$, $20x$

	x	$+4$
x	x^2	$4x$
$+16$	$16x$	64

$(x+16)(x+4)$

$x^2 - 16x + 64 = (x - 8)(x - 8)$

$= x^2 - 8x - 8x + 64$

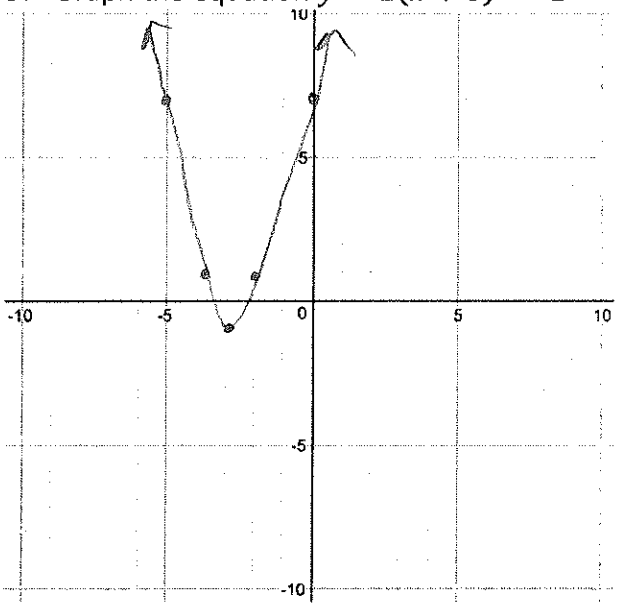
$= x^2 - 16x + 64$

8. Suppose we have an original block, $A(x) = x^2$. We extend the block by 3 inches on one side and 7 inches on the other side. Illustrate this situation using a diagram, then write the equation for the rectangle in factored form.

	x	$+3$
x	x^2	$3x$
$+7$	$7x$	21

$(x+7)(x+3)$

9. Graph the equation $y = 2(x + 3)^2 - 1$



Vertex: $(-3, -1)$

Axis of Symmetry: $x = -3$

Is there a Maximum or a minimum?

Describe the transformations of this equation (is it shifted up/down/left/right, are there any shrinks or stretches)

- Left 3
- Down 1
- Vertical stretch 2

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

$= (2x+6)(x+3) - 1$

$= 2x^2 + 6x + 6x + 18 - 1$

$= 2x^2 + 12x + 17$

Write that same equation in standard form: $y = 2x^2 + 12x + 17$

10. Assume our starting equation is $y = x^2$, write the new equation in the following situations.

a. Shifted up 5 units

$y = x^2 + 5$

b. Vertical stretch by 3 and shifted down 2 units

$y = 3x^2 - 2$

c. Shifted to the right 1 unit and up 2 units

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

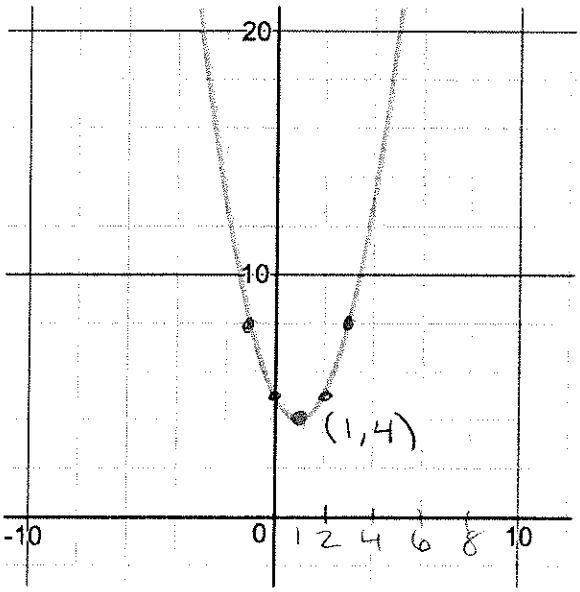
d. Vertical shrink by 2

$y = \frac{1}{2}x^2$

e. Flipped across the x-axis

$y = -x^2$

11. Write the vertex equation for this graph, then write it in standard form.



Vertex Form $y = (x-1)^2 + 4$

Standard Form $y = x^2 - 2x + 5$

$y = (x-1)(x-1) + 4$

$y = x^2 - x - x + 1 + 4$

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

12. Write this equation in vertex form

$\frac{4x^2}{4} + \frac{16x}{4} + \frac{8}{4}$

$4(x^2 + 4x + 2)$

$\frac{4}{2} = 2, (2)^2 = 4$

$4(x^2 + 4x + 4 + 2 - 4)$

$4[(x+2)^2 - 2]$

Vertex Form $4(x+2)^2 - 8$