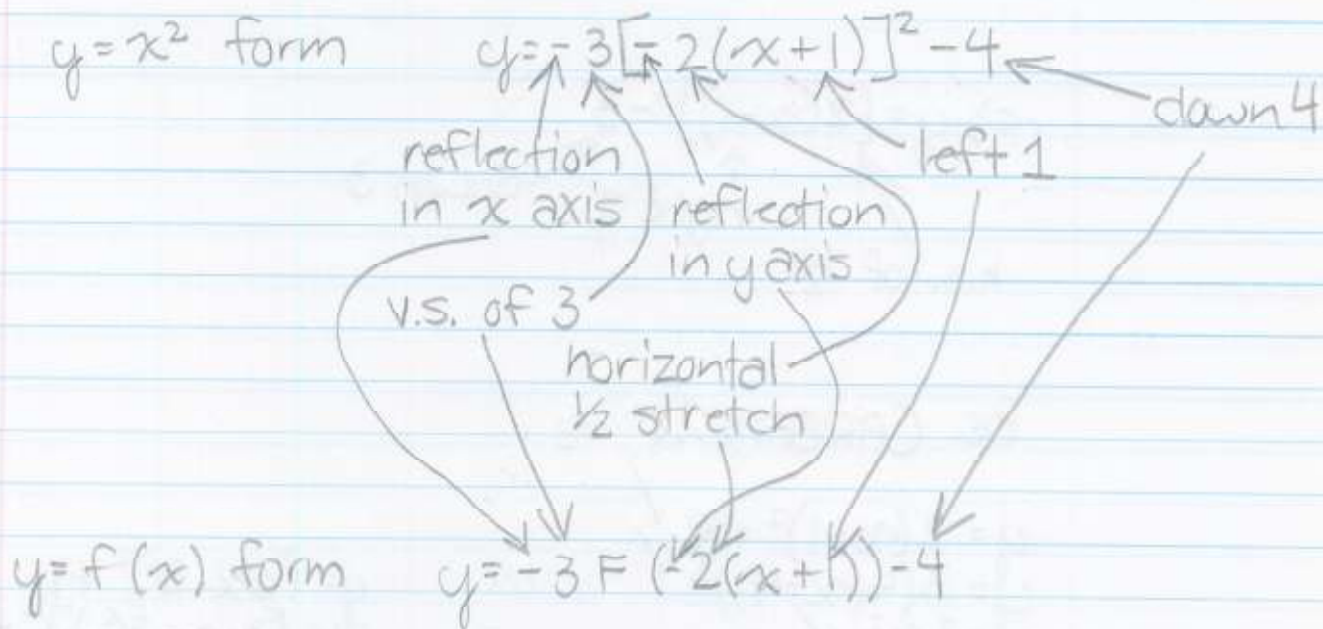


November 6<sup>th</sup>, 2007

## Notation for Transformations

### Types of transformations

- reflection in x axis (-)
- reflection in y axis (-)
- horizontal stretch ( $x \#$ )
- vertical stretch ( $x \#$ )
- horizontal translation ( $x \#$ )
- vertical translation ( $x \#$ )



\* Inside brackets  $\rightarrow$  affects  $x$   
Outside brackets  $\rightarrow$  affects  $y$

State the transformations of each

a)  $y = -3(x+1)^2 - 4$

reflection in x axis  
 v.s. of 3  
 left 1  
 down 4

b)  $y = (3x)^2 - 1$

h.s. of  $\frac{1}{2}$   
 down 1

c)  $y = [2(x-1)]^2 - 3$

h.s. of  $\frac{1}{2}$   
 right 1  
 down 3

BE CAREFUL!!

$y = 2(x+1)^2 + 3$  ✓

$y = 3(4(x-4))^2$  ✓

$y = 3x^2$  ✓

$y = (4x)^2$  ✓

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

\* factor out!  
 $(2(x+2))^2 - 3$

$y = (3x-5)^2 + 1$   
 $y = [3(x-\frac{5}{3})]^2 + 1$

\*  $x$  is always opposite! except when using mapping rules!

MAPPING RULE

$r \rightarrow$  reflection

$s \rightarrow$  stretch

$t \rightarrow$  translation.

$$y = -3(-2(x+1))^2 - 4$$

$$\begin{matrix} (x, y) \\ (1, 1) \end{matrix} \rightarrow (-\frac{1}{2}x - 1, -3y - 4)$$

Write each as mapping rule...

$$1) y = \frac{2}{3}(x-4)^2 - 2 \quad (x, y) \rightarrow (x+4, \frac{2}{3}y-2)$$

$$2) y = 3F(\frac{1}{2}(x+1)) + 4 \quad (x, y) \rightarrow (2x-1, 3y+4)$$

\*\*\*

$\mp$  (add or subtract) = slide

$\times$  (multiply) = stretch

$-$  (negative) = reflection.





November 5, 2007

## RECAP

Sketch using a table of values  
Compare the two graphs.

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

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

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

<u>x</u>	<u>y</u>
-3	$2(-3)^2 + 1 = 19$
-2	9
-1	3
0	1
1	3
2	9
3	19

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

<u>x</u>	<u>y</u>
-3	14
-2	4
-1	-2
0	-4
1	-2
2	4
3	14

Ex:  $y = (x+2)^2 \leftarrow$  left 2

$y = (x-2)^2 \leftarrow$  right 2

if 2 is being squared then it affects the x

## Transformations

move left or right  $(x + \downarrow \#)^2$

move up or down  $(x)^2 + \downarrow \#$

(h.s.) Horizontal side  $(\downarrow \# x)^2$

(v.s.) Vertical side  $\downarrow \# (x)^2$

## State Transformations

1)  $y = 2x^2 + 1$  v.s. of 2, up 1

2)  $y = (2x)^2 - 1$  h.s. of  $\frac{1}{2}$ , down 1

3)  $y = 3(x+1)^2 - 1$  v.s. of 3, left 1, down 1

4)  $y = \frac{1}{2}(x-4)^2 - 2$  v.s. of  $\frac{1}{2}$ , right 4, down 2

5)  $y = x^2 - 3$  down 3

6)  $y = 3(x+1)^2$  v.s. of 3, left 1