

Mathematics 10D

Q.04 – Graphing from Vertex Form

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$$y = \underline{a}(x - \underline{h})^2 + \underline{k}$$

Transformations

Base: $y = x^2$

a : vertical stretch/compression

$$a > 1,$$

$$\underline{a < -1}$$

skinny

$$0 < a < 1$$

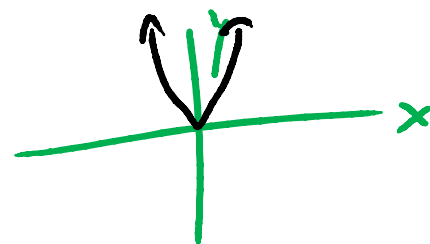
$$\underline{-1 < a < 0}$$

fatter

h : horizontal shift

k : vertical shift

a : vertical stretch
 y multiply



h : horizontal shift
 x add

k : vertical shift
 y add

$$y = x^2$$

x	y
-2	4
-1	1
0	0
1	1
2	4

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

$x + h$	$a y + k$
-2 + h	$4a + k$
-1 + h	$1a + k$
0 + h	$0a + k$
1 + h	$1a + k$
2 + h	$4a + k$

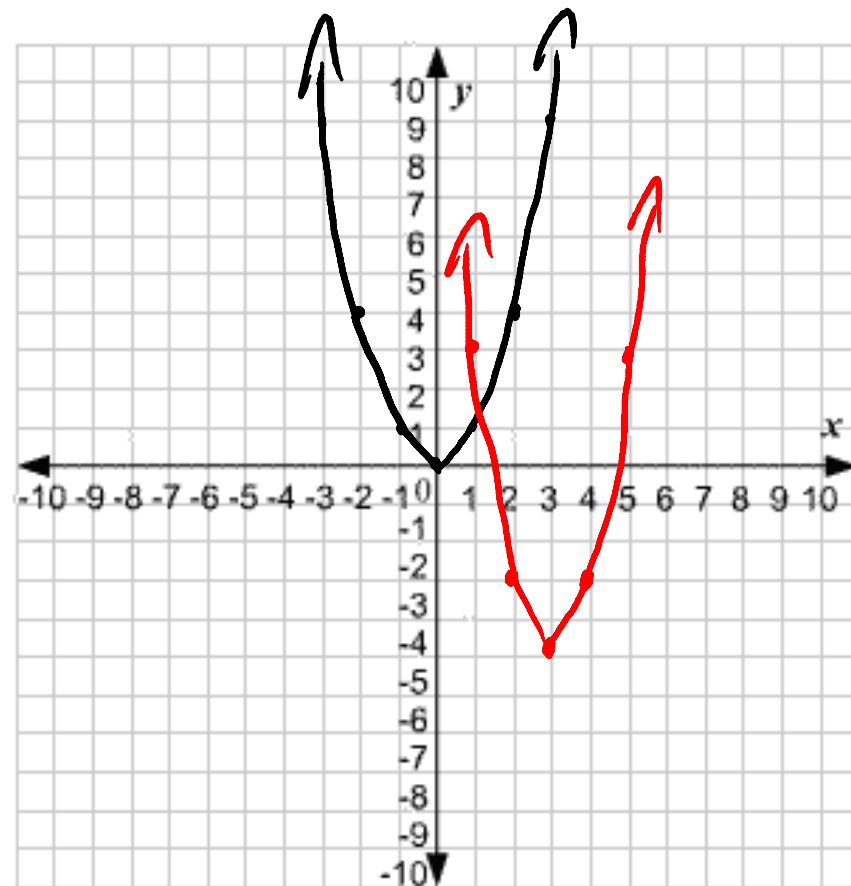
$$y = 2(x - 3)^2 - 5$$

- ① Vertical stretch of 2
- ② Horizontal shift of +3
- ③ Vertical shift of -5

$y = x^2$

x	y
-2	4
-1	1
0	0
1	1
2	4

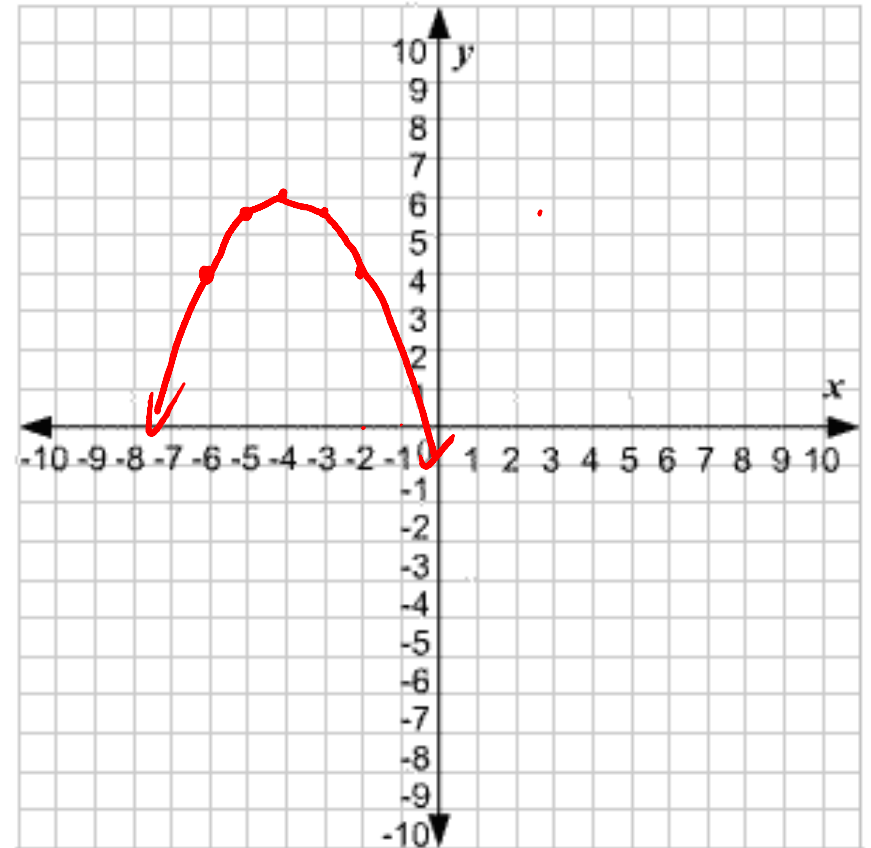
$x + 3$	$2y - 5$
1	3
2	-3
3	-5
4	-3
5	3



$$y = -\frac{1}{2}(x+4)^2 + 6$$

$(x - -4)$

- ① Vertical Stretch of $-\frac{1}{2}$
- ② Horizontal Shift of -4
- ③ Vertical Shift of $+6$



$$y = x^2$$

x	y
-2	4
-1	1
0	0
1	1
2	4

$x - 4$	$-\frac{1}{2}y + 6$
-6	4
-5	5.5
-4	6
-3	5.5
-2	4