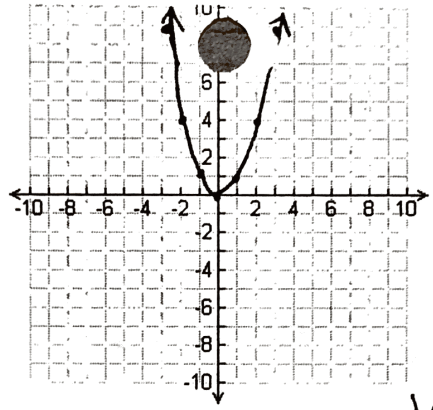
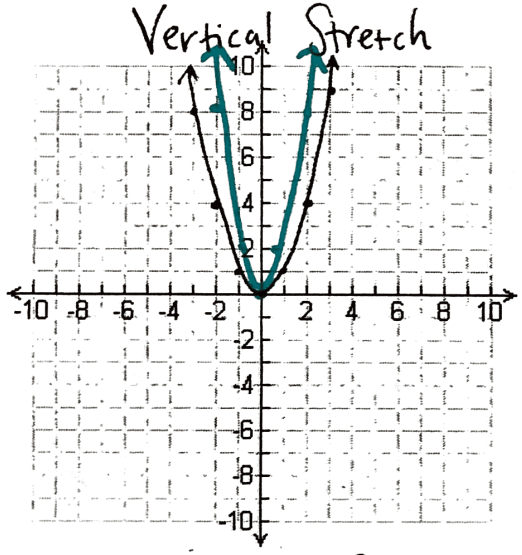


$f(x) = x^2$

-2	4
-1	1
0	0
1	1
2	4

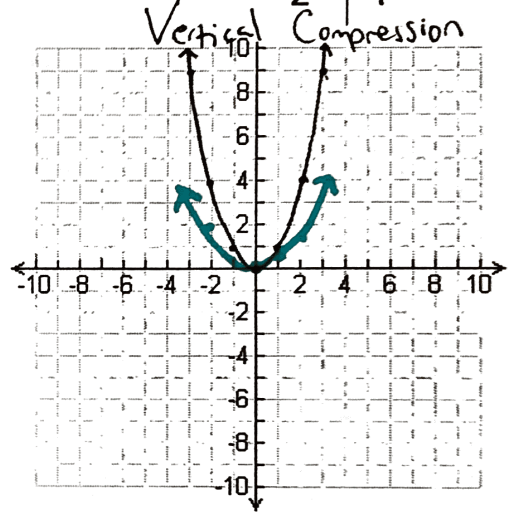
Vertical Stretch



$f(x) = 2x^2$

-2	~~4~~ 8
-1	~~1~~ 2
0	~~0~~ 0
1	~~1~~ 2
2	~~4~~ 8

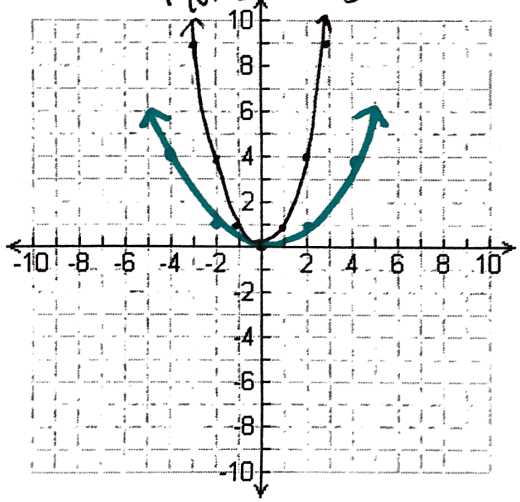
Vertical Compression



$f(x) = \frac{1}{2}x^2$

-2	~~4~~ 2
-1	~~1~~ $\frac{1}{2}$
0	~~0~~ 0
1	~~1~~ $\frac{1}{2}$
2	~~4~~ 2

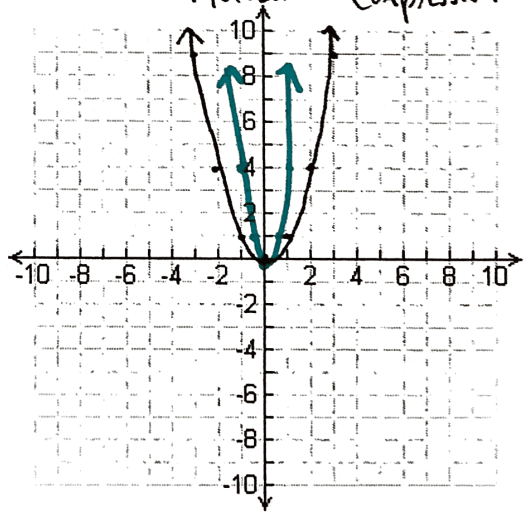
Horizontal Stretch



$f(x) = (\frac{1}{2}x)^2$

~~-4~~ ~~-2~~	4
~~-2~~ ~~-1~~	1
~~0~~ ~~0~~	0
~~2~~ ~~1~~	1
~~4~~ ~~2~~	4

Horizontal Compression



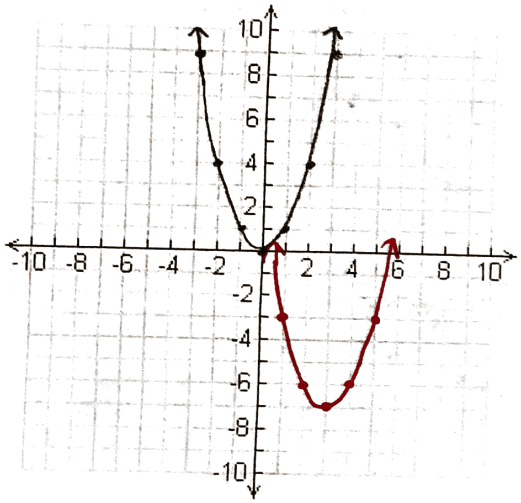
$f(x) = (2x)^2$

~~-1~~ ~~-2~~	4
~~$-\frac{1}{2}$~~ ~~-1~~	1
~~0~~ ~~0~~	0
~~$\frac{1}{2}$~~ ~~1~~	1
~~1~~ ~~2~~	4

Sequence of Transformations

Order in which to do Transformations

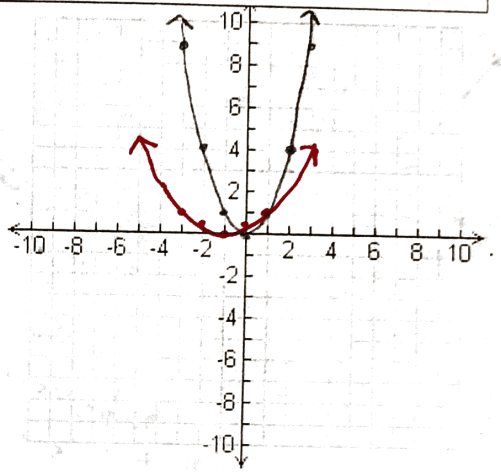
1. Do any horizontal transformations
2. Do any vertical stretches or compressions
3. Do any vertical reflections
4. Do any vertical shifts



$f(x) = (x-3)^2 - 7$

right 3 down 7

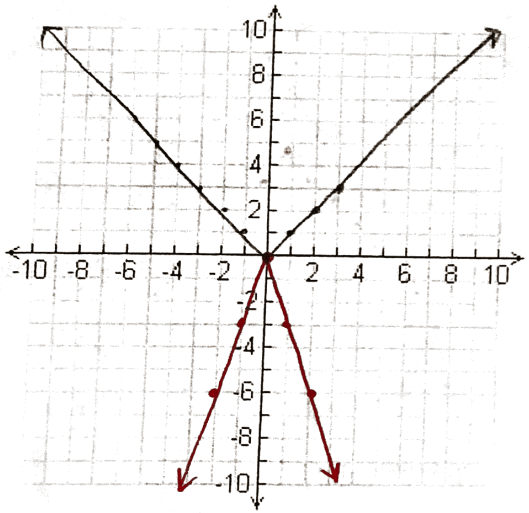
1 ~~-2~~	4 -3
2 ~~-1~~	1 -6
3 0	0 -7
4 ~~1~~	1 -6
5 ~~2~~	4 -3



$f(x) = \frac{1}{4}(x+1)^2$

left 1, multiply y values by $\frac{1}{4}$

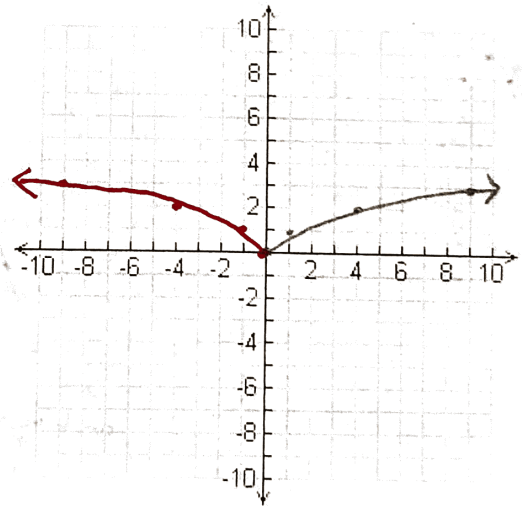
-3 ~~-2~~	4 1
-2 ~~-1~~	1 $\frac{1}{4}$
-1 0	0 0
0 ~~1~~	1 $\frac{1}{4}$
1 ~~2~~	4 1



$f(x) = -3|x|$

reflection & vertical stretch

-2	~~2~~ -6
-1	~~1~~ -3
0	~~0~~ 0
1	~~1~~ -3
2	~~2~~ -6



$f(x) = \sqrt{x}$

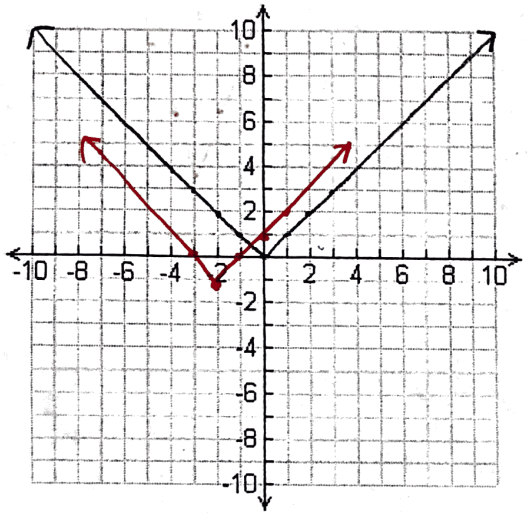
$f(-x)$ reflect across y axis

0 ~~0~~	0
-1 ~~1~~	1
-4 ~~4~~	2
-9 ~~9~~	3

$f(x) = |x|$

$f(x+2) - 1$

left 2 down 1

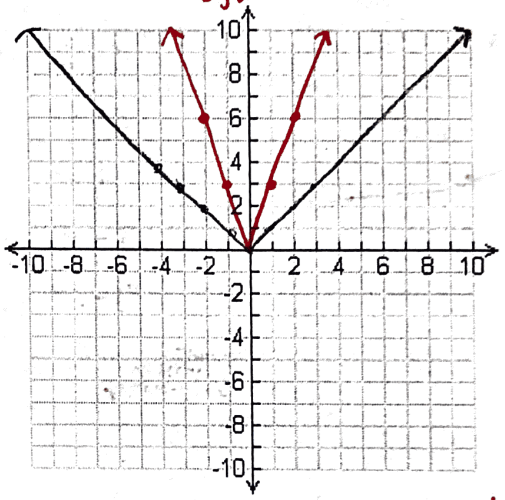


$f(x) = |x|$

$3f(-x)$

↓ reflect across y axis

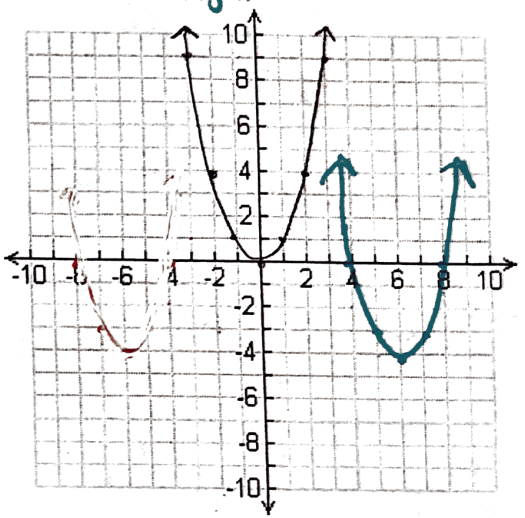
↓ stretch by 3



$f(x) = x^2$

$f(x-6) - 4$

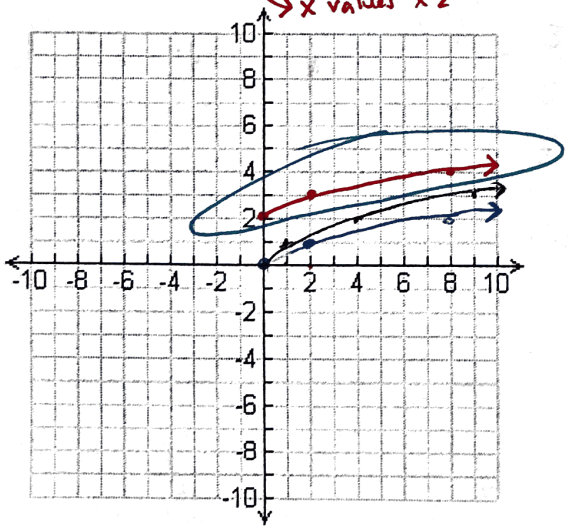
right 6 down 4



$f(x) = \sqrt{x}$

$f\left(\frac{1}{2}x\right) + 2$ → shift up 2

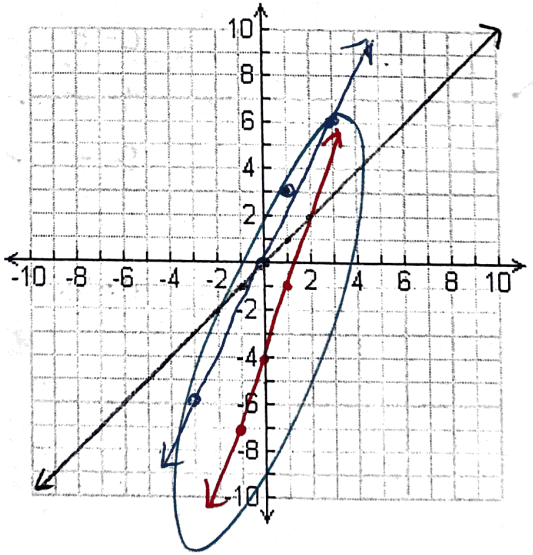
↳ x values x2



$f(x) = x$ → $3x - 4$

$f(3x) - 4$ → shift down 4

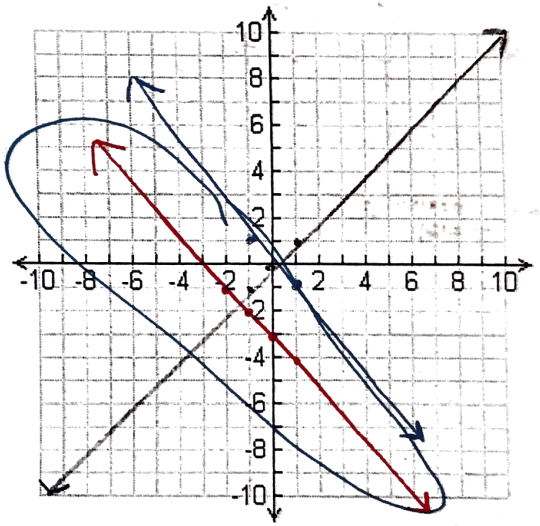
↳ x values × $\frac{1}{3}$



$f(x) = x$ → $-x - 3$

$-f(x) - 3$ → down 3

↳ reflect across x

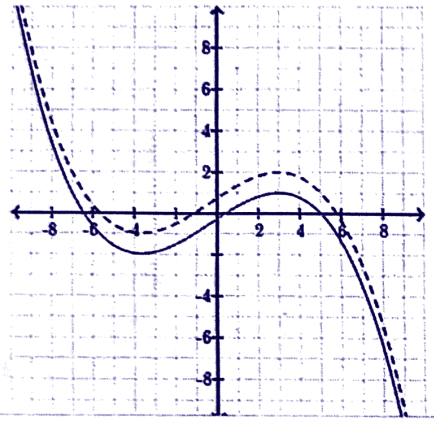


1. Dashed line is transformed the function for 1-3

Ⓐ $f(x)+1$

Ⓑ $f(x+1)$

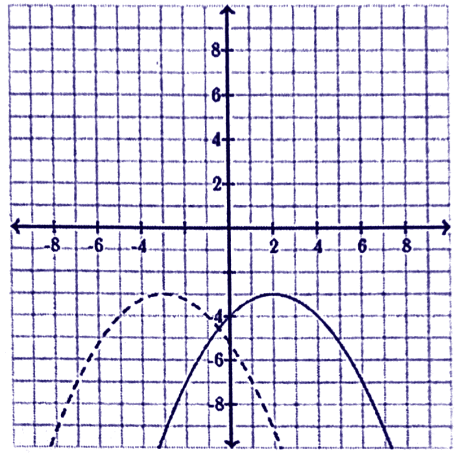
Ⓒ $f(x-1)$



2. Ⓐ $f(x)-5$

Ⓑ $f(x-5)$

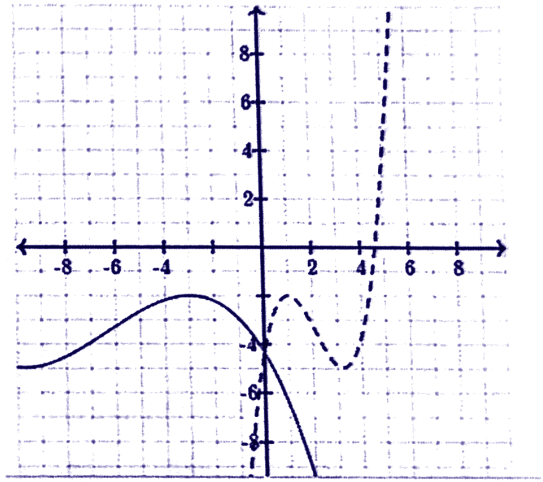
Ⓒ $f(x+5)$



3. Ⓐ $f(-3x)$

Ⓑ $f(-\frac{1}{3}x)$

Ⓒ $f(\frac{1}{3}x)$



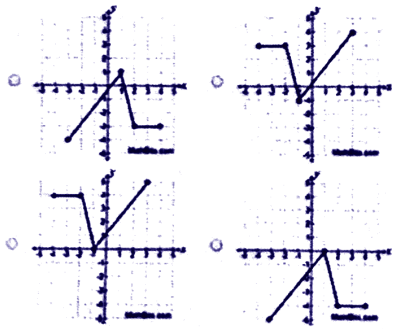
4. Function $f(x)$ is shown in the table at the right. Which of the choices represents the value of $h(3)$, given that $h(x) = f(x) + 4$?

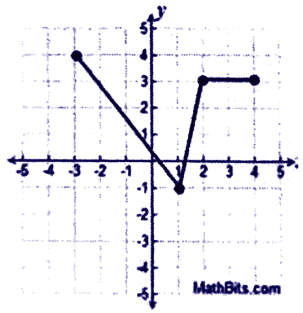
Choose:

○ 7 ○ -6 ○ 11 ○ -10

x	$f(x)$
2	-12
3	-10
7	7
11	14
12	18

5. Given $f(x)$ shown at the right.
Which graph choice depicts $-f(x)$?
Choose:



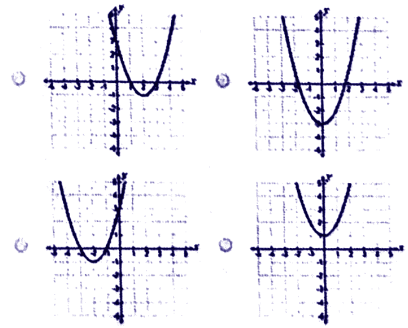


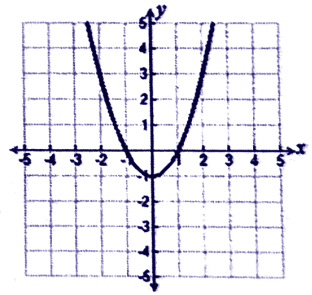
6. If the graph of the function $y = 2^x$ is reflected over the x-axis, the equation of the reflection is _____.

Choose:

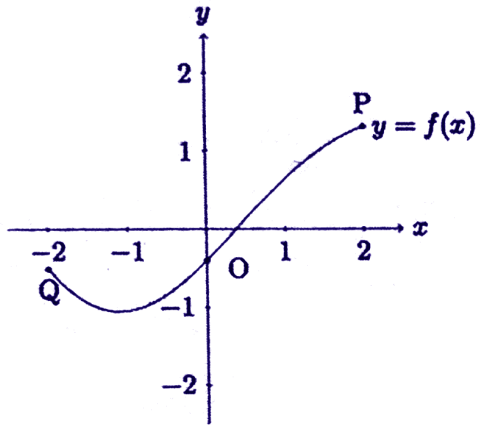
○ $y = 2^{-x}$ ○ $y = x^2$ ○ $y = -(2^x)$ ○ $y = -x^2$

7. Given $g(x)$ shown at the right.
Which graph depicts $g(x+2)$?
Choose:





8. The figure shows the graph of a function f whose domain is the interval $-2 \le x \le 2$.



a. In (i)–(iii), sketch the graph of the given function and compare with the graph of f. Explain what you see.

i. $g(x) = f(x) + 2$

ii. $h(x) = -f(x)$

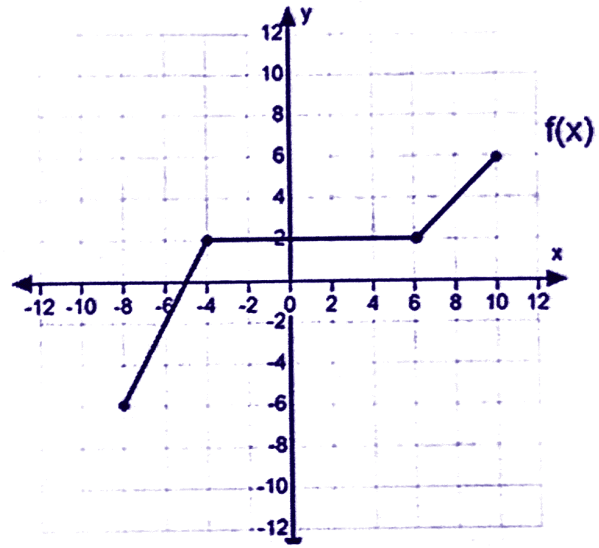
iii. $p(x) = f(x + 2)$

b. The points labelled Q, O, P on the graph of f have coordinates

$$Q = (-2, -0.509), \quad O = (0, -0.4), \quad P = (2, 1.309).$$

What are the coordinates of the points corresponding to P, O, Q on the graphs of g, h, and p?

9.



x	f(x)
-8	-6
-4	2
6	2
10	6

a. Graph $f(-x)$ in one color.

b. Graph $f(x - 2) + 4$ in another color.

c. Graph $f(2x)$ in a third color.