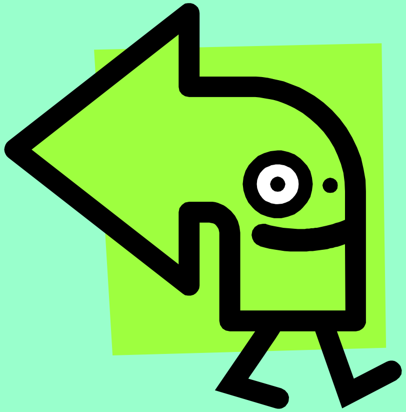


9.

Graph of $f(x+a)$

Graph of f(x + a)

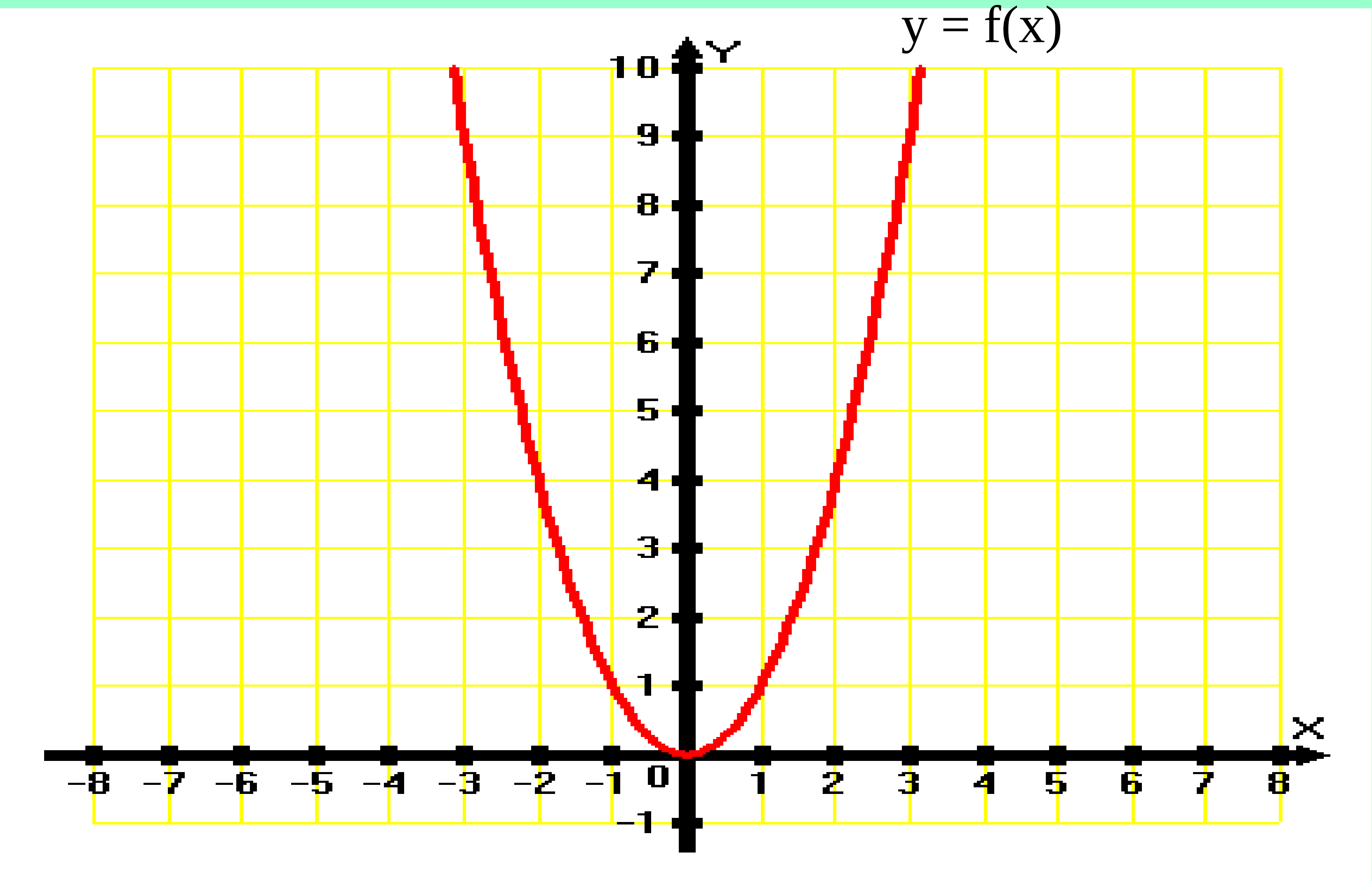
Having looked at f(x) + a, we can now look at another transformation.

Whereas f(x) + a produced changes in the y direction, we are now going to look at changes in the x-direction.

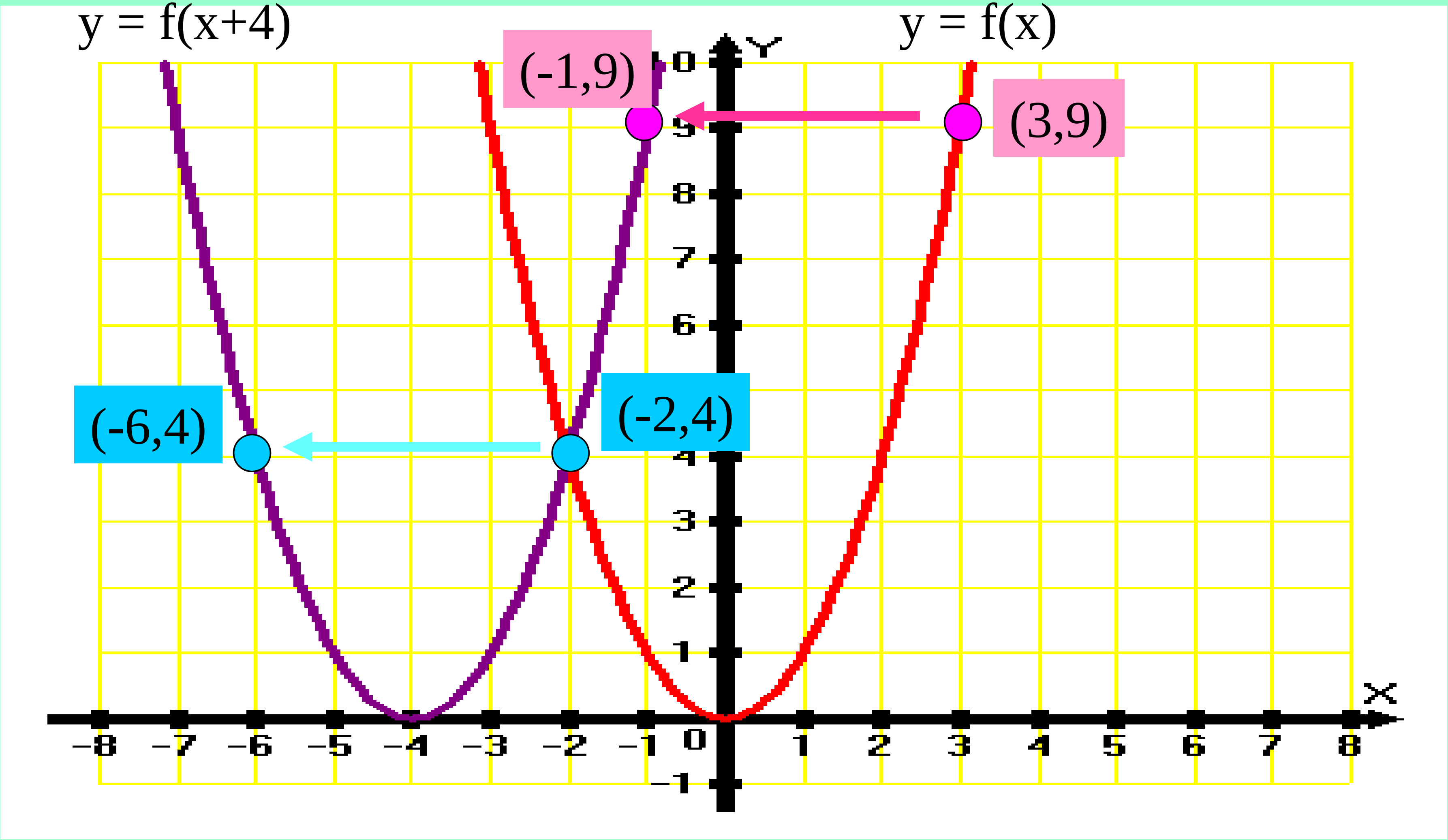
Lets look at what happens when we add a constant to the x values:

That is: $y = f(x) \rightarrow y = f(x + a)$

Starting again with the function $y = x^2$:

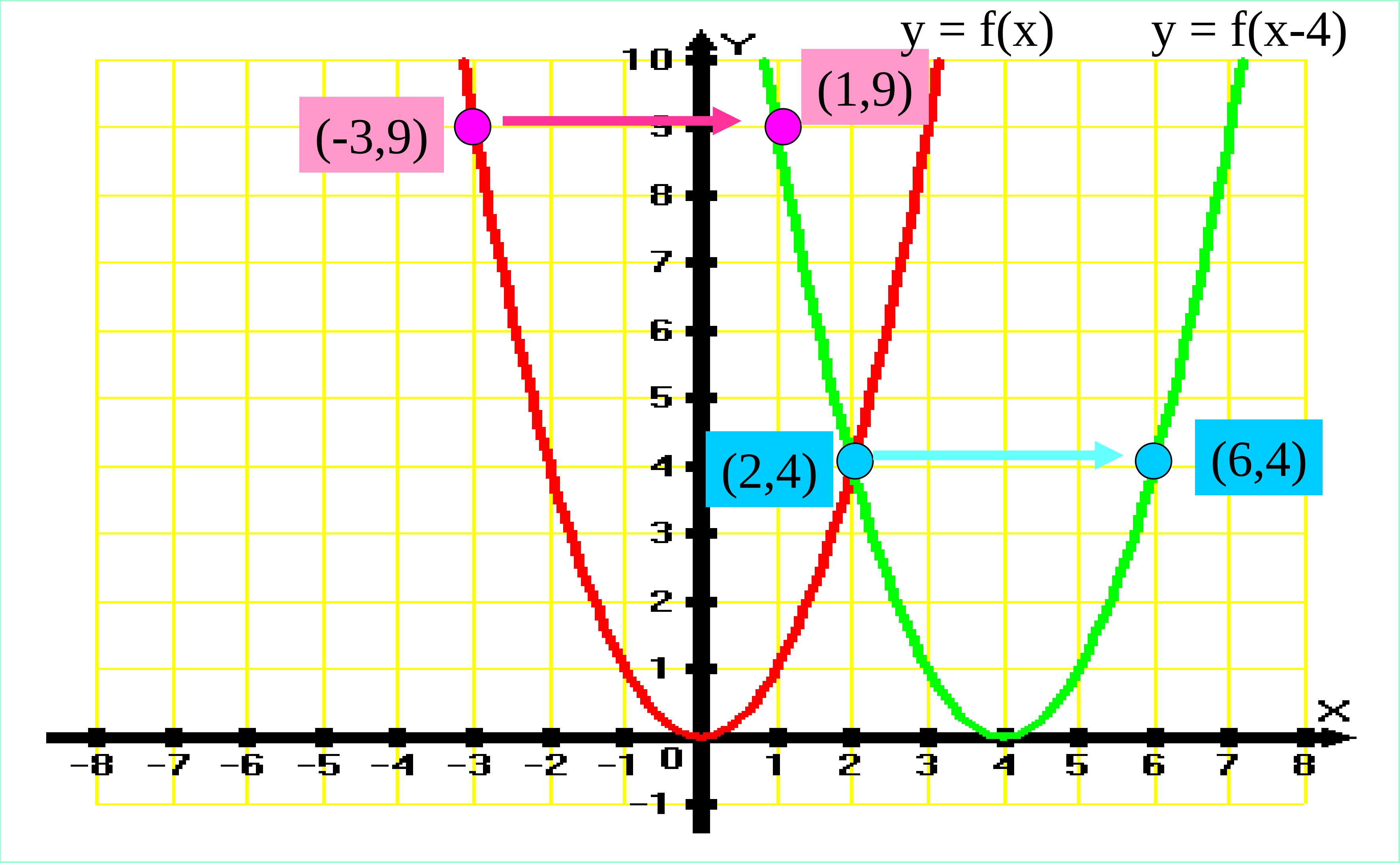


What will happen if we add 4 to each x value input ie. $y = (x+4)^2$?



EFFECT : 1. 4 has been subtracted from all x-coordinates
2. Graph slides TO LEFT by 4

Will the effect be the same if we subtract 4 from x values?



EFFECT : 1. 4 has been added to all x-coordinates

2. Graph slides TO RIGHT by 4

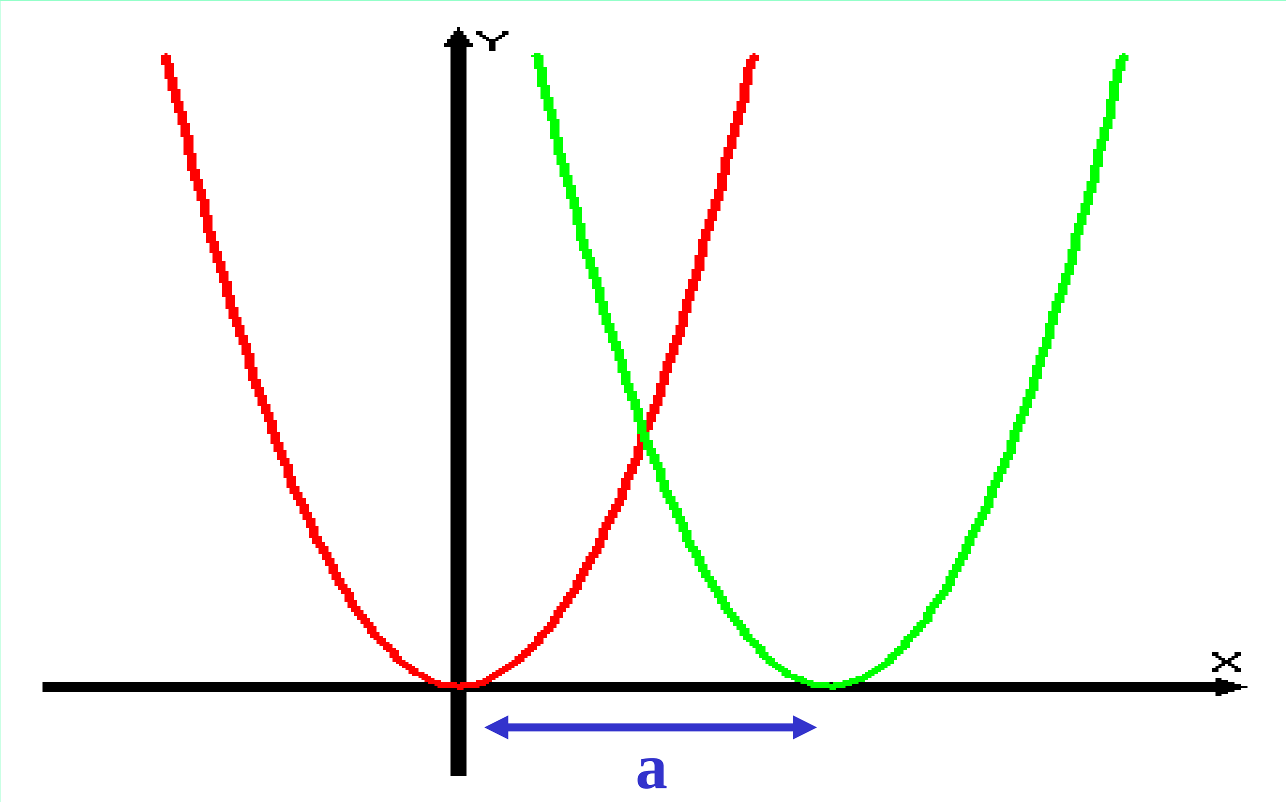
Graph of y = f(x)+a

Copy the following:

To obtain graph of **y = f(x+a)** slide y = f(x) horizontally by **a** units

To LEFT if a is positive

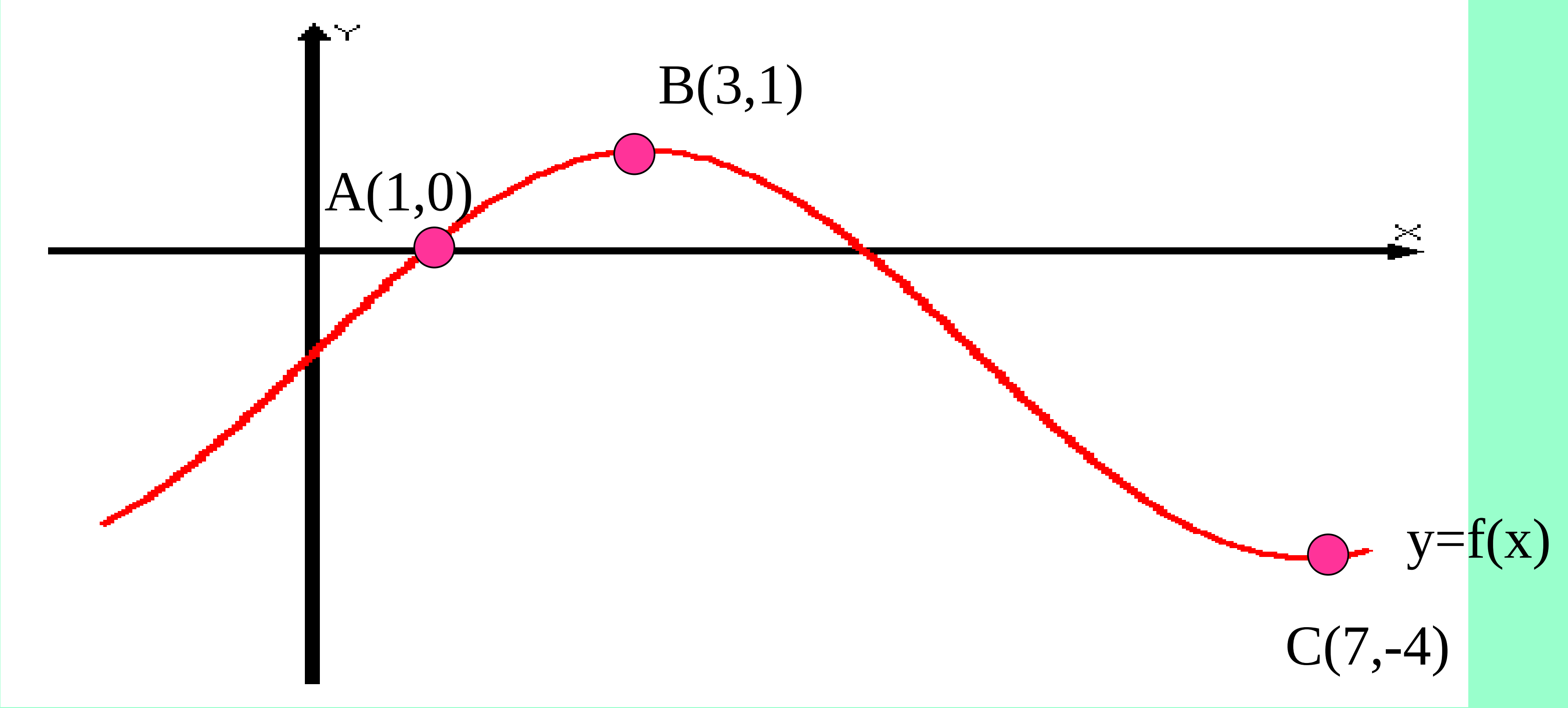
To RIGHT if a is negative



Example

Shown is the graph of f(x).

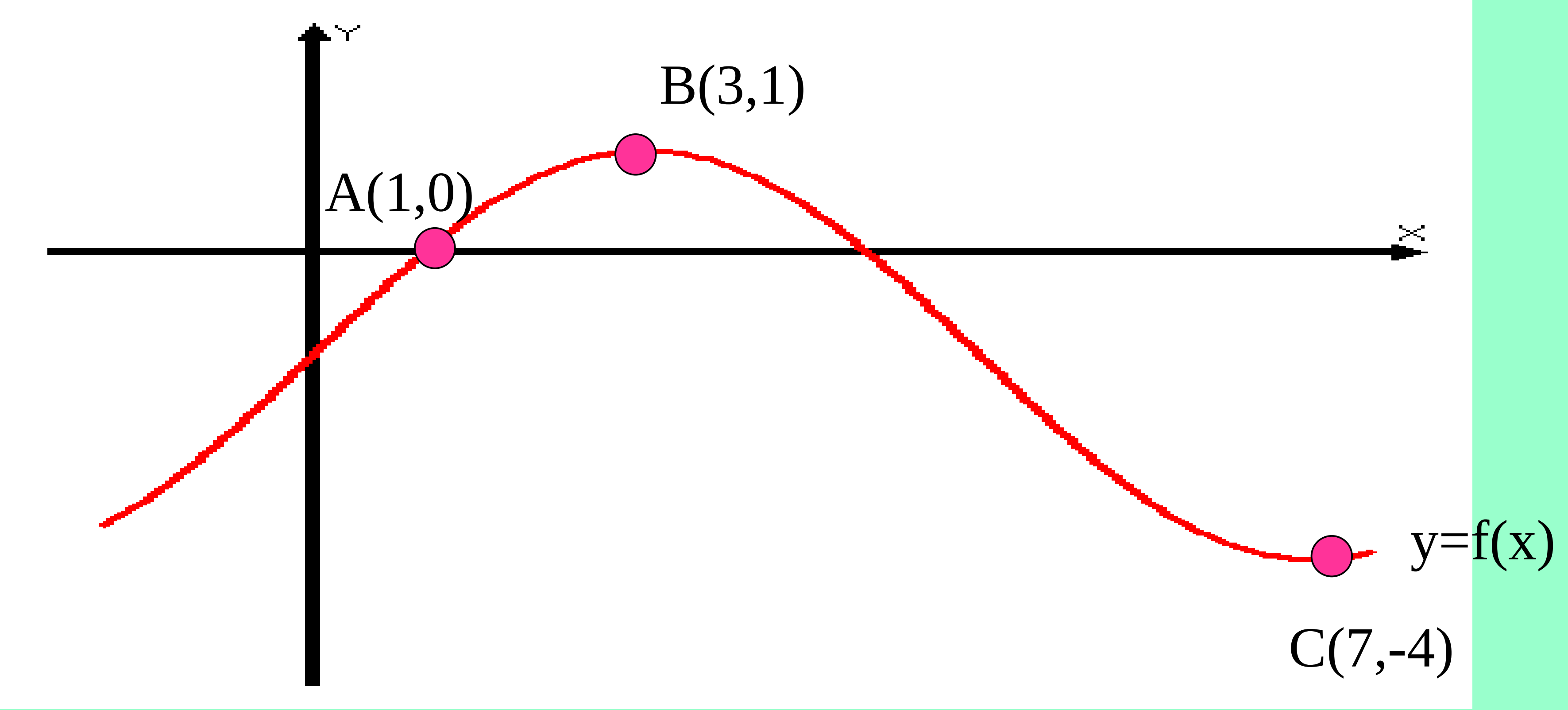
Sketch the graph of f(x+2), clearly annotating the images of A, B and C.



Example

As required graph is y = f(x **+ 2)** we **subtract 2** from each x-coordinate.

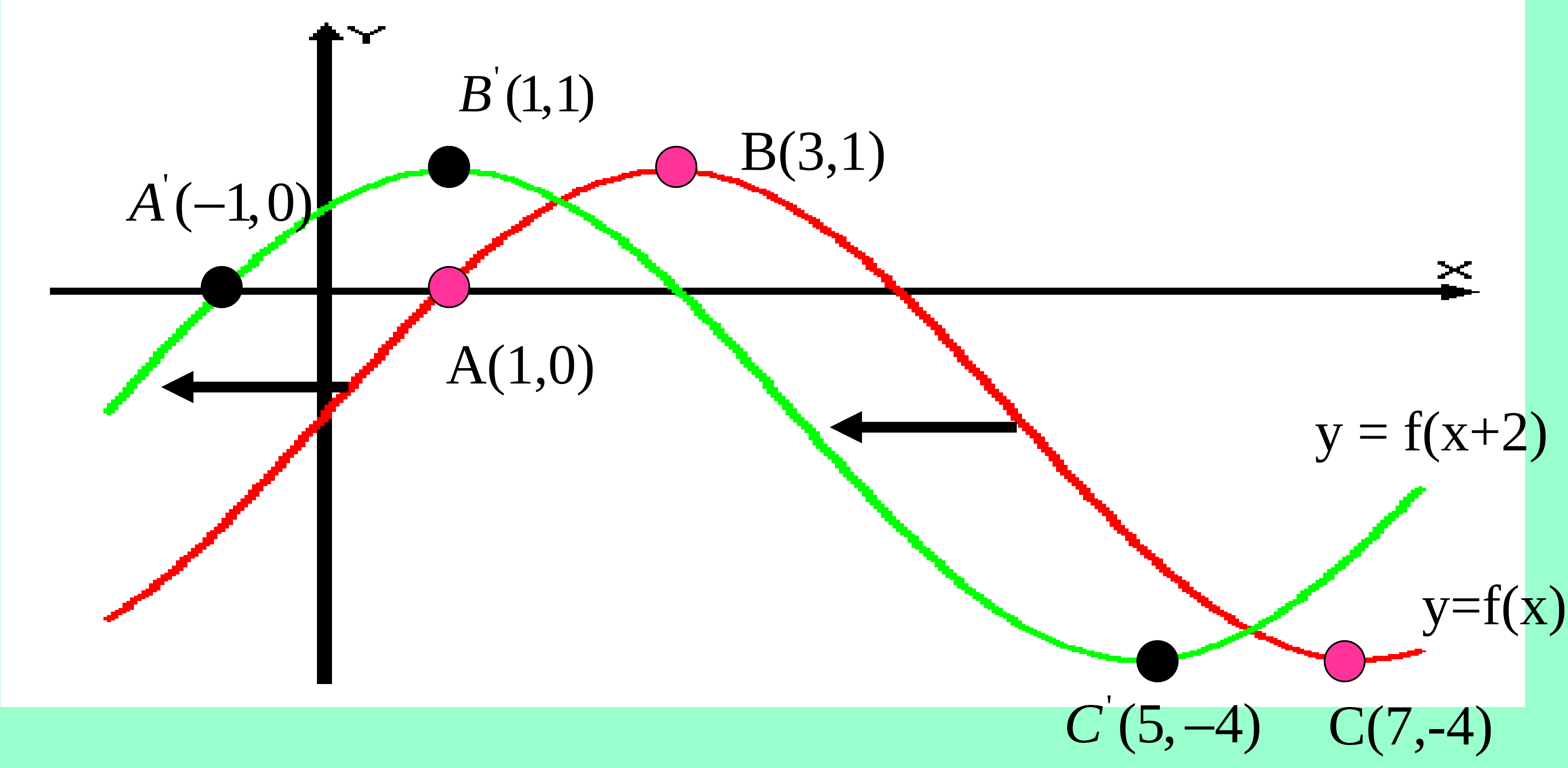
$A(1,0) \rightarrow A'(-1,0) \qquad B(3,1) \rightarrow B'(1,1) \qquad C(7,-4) \rightarrow C'(5,-4)$



Solution:

As required graph is y = f(x **+ 2)** we **subtract 2** to each x-coordinate.

$A(1,0) \to A'(-1,0)$ $B(3,1) \to B'(1,1)$ $C(7,-4) \to C'(5,-4)$



Heinemann, p.38, Ex 3E,
Q3 & 4