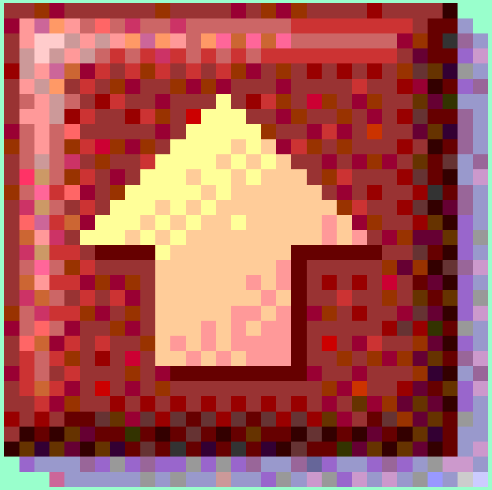
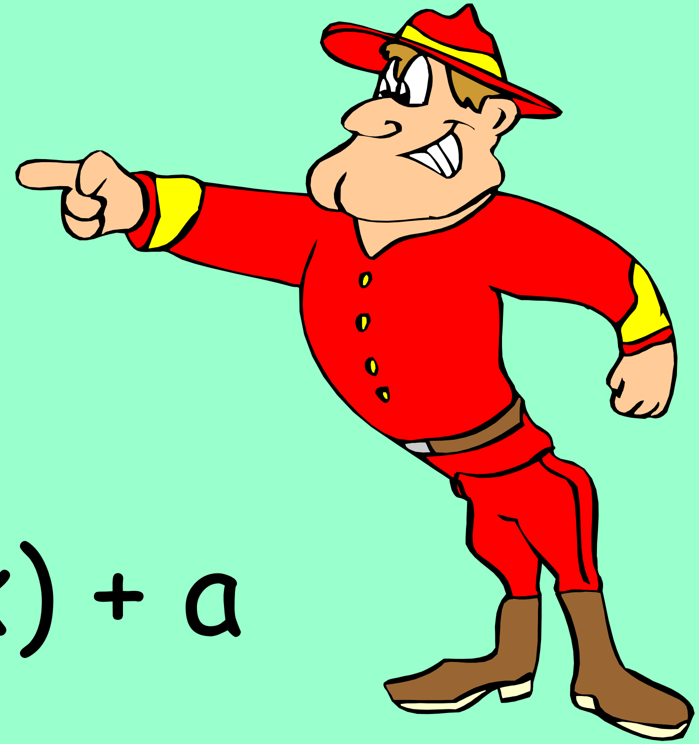
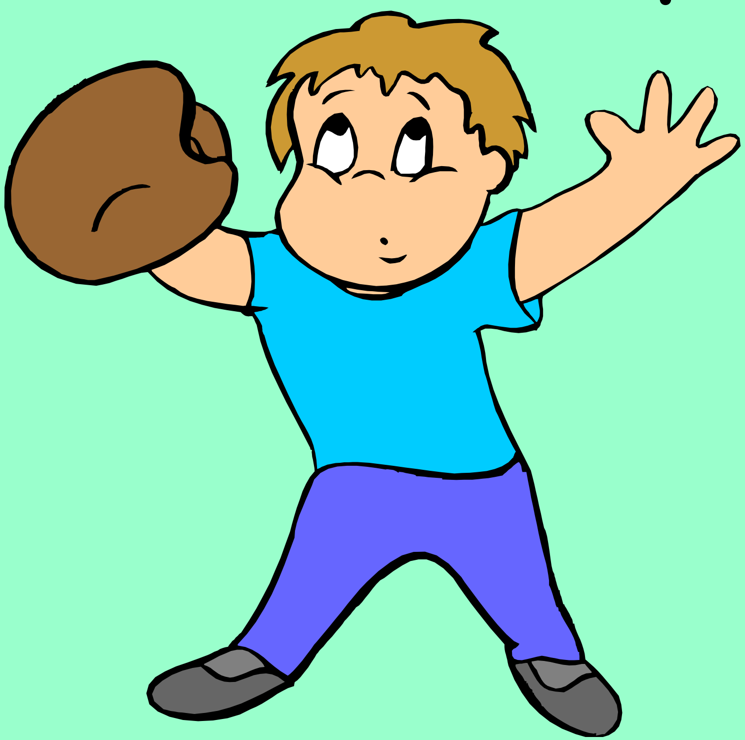
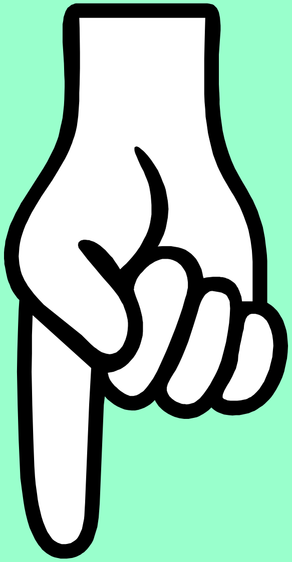




8.

Graph of $f(x) + a$





Graphs of Related Functions

Sometimes it is desirable for us to know what will happen if we make some changes to a function.

Rather than working out a new set of values for each x, it is usually easier to use the graph of f(x) and apply the changes to this graph.

It will become important later in the course to understand that each f(x) is one member of a set of functions with similar properties.

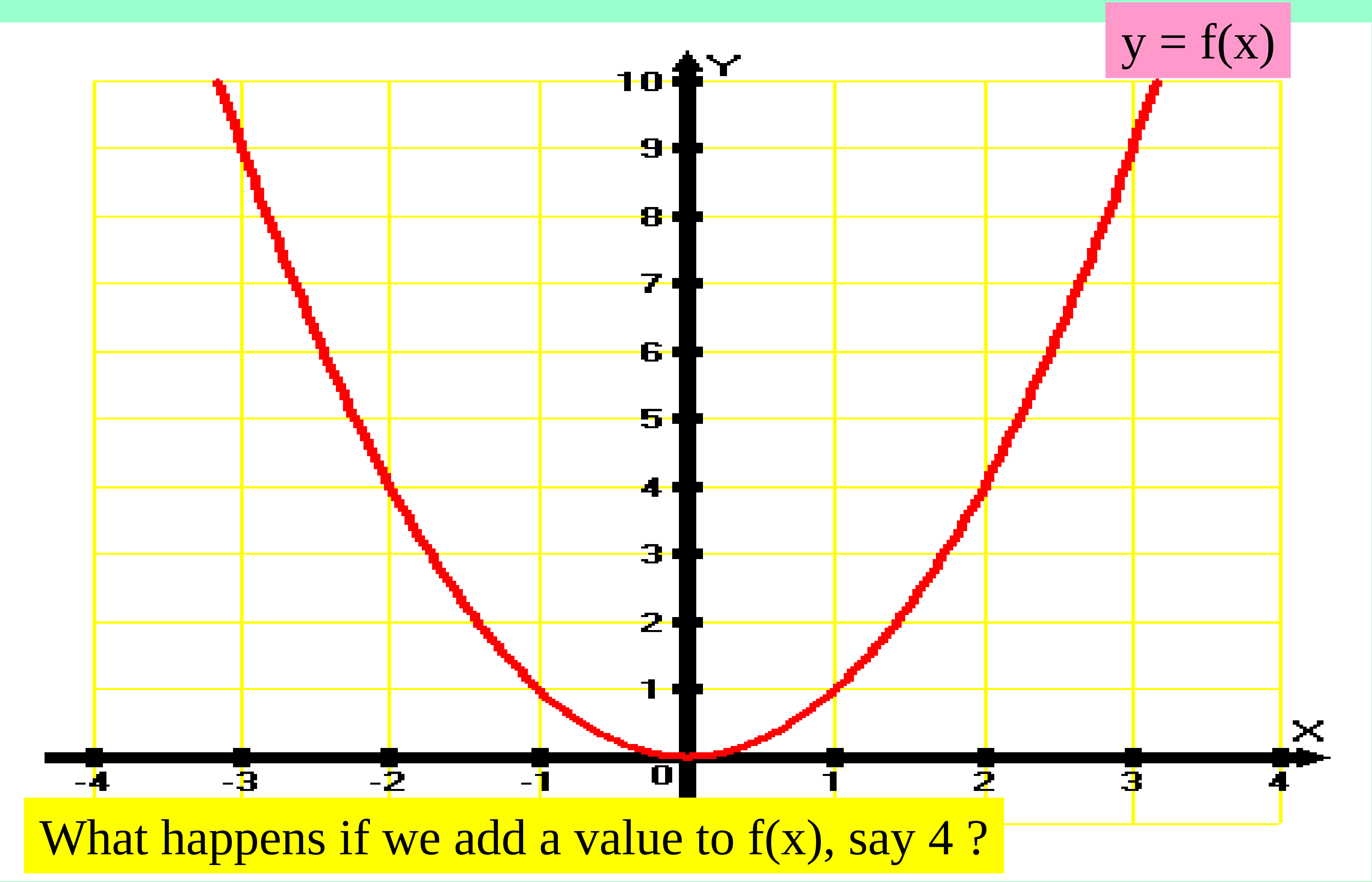
That is why we will look at the effect of making changes to the given function.

To start with we will look at the effect of adding a constant value to the given function:

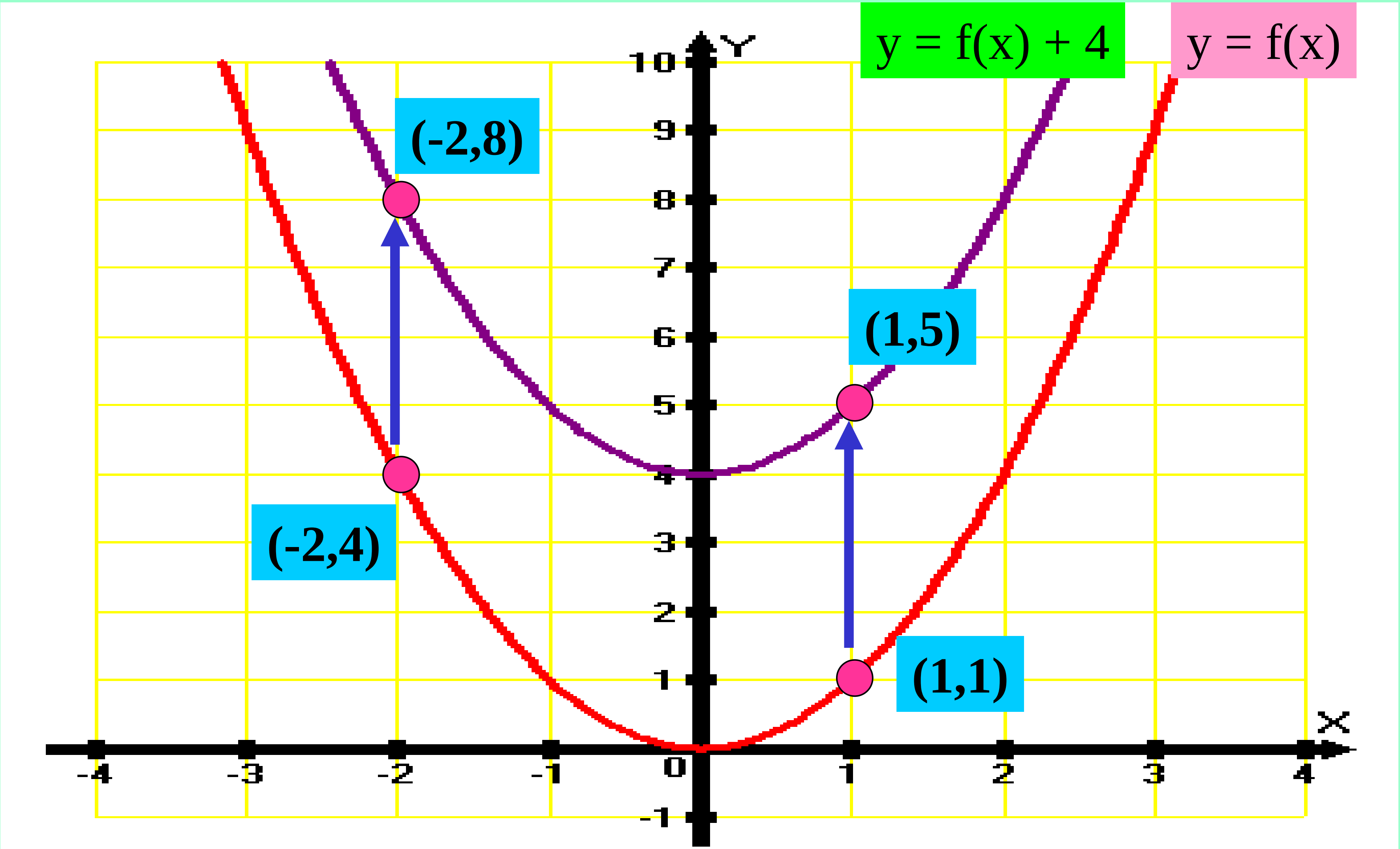
so $f(x) \rightarrow f(x) + a$

Graph of y = f(x) + a

Lets start by looking at the graph of $y = x^2$:

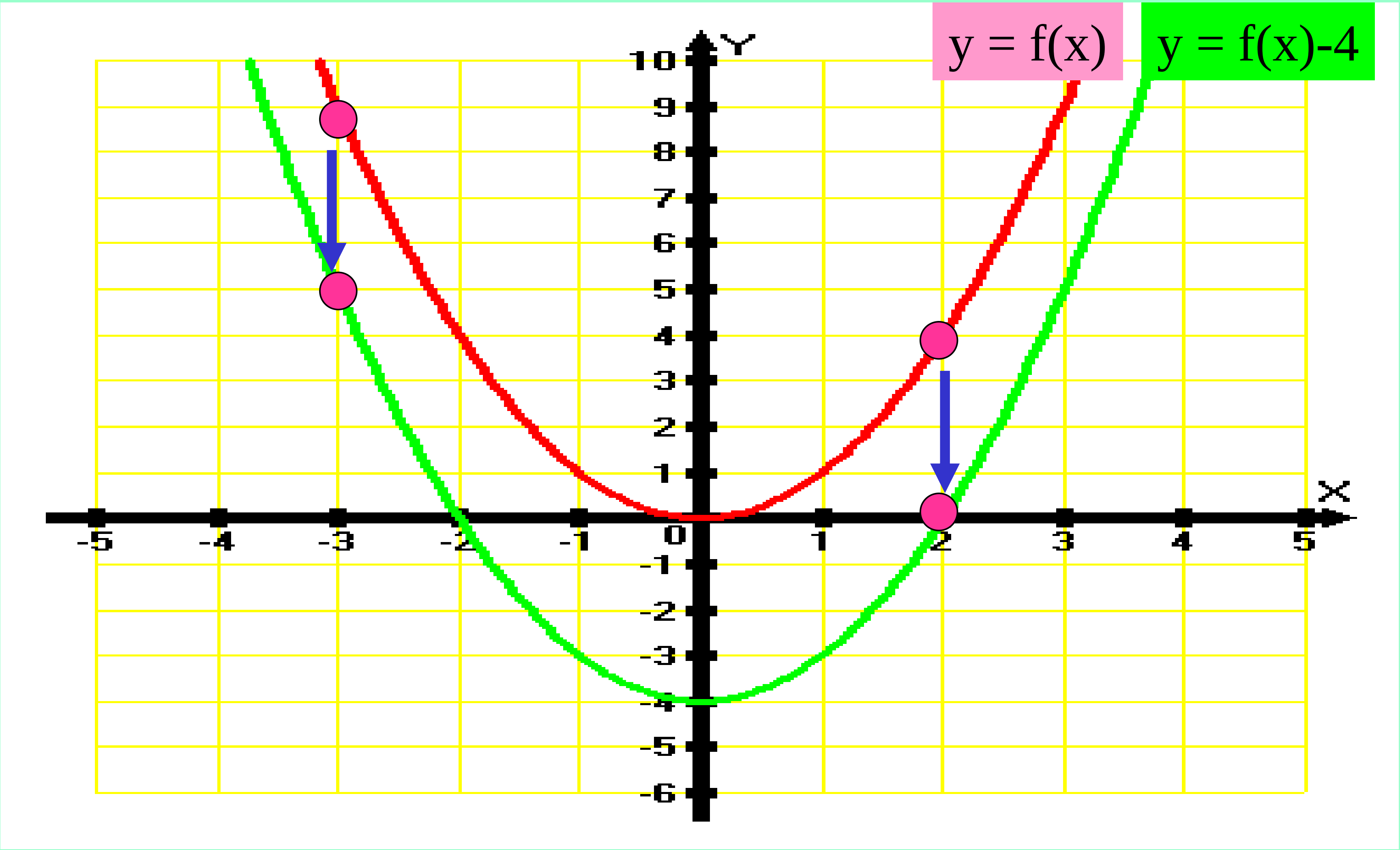


What happens if we add a value to f(x), say 4 ?



EFFECT : 1. 4 has been added to all y-coordinates
2. Graph slides UP y-axis by 4

What happens if we **subtract** 4 from all values f f(x)?



EFFECT : 1. 4 has been subtracted from all y-coordinates

2. Graph slides DOWN y-axis by 4

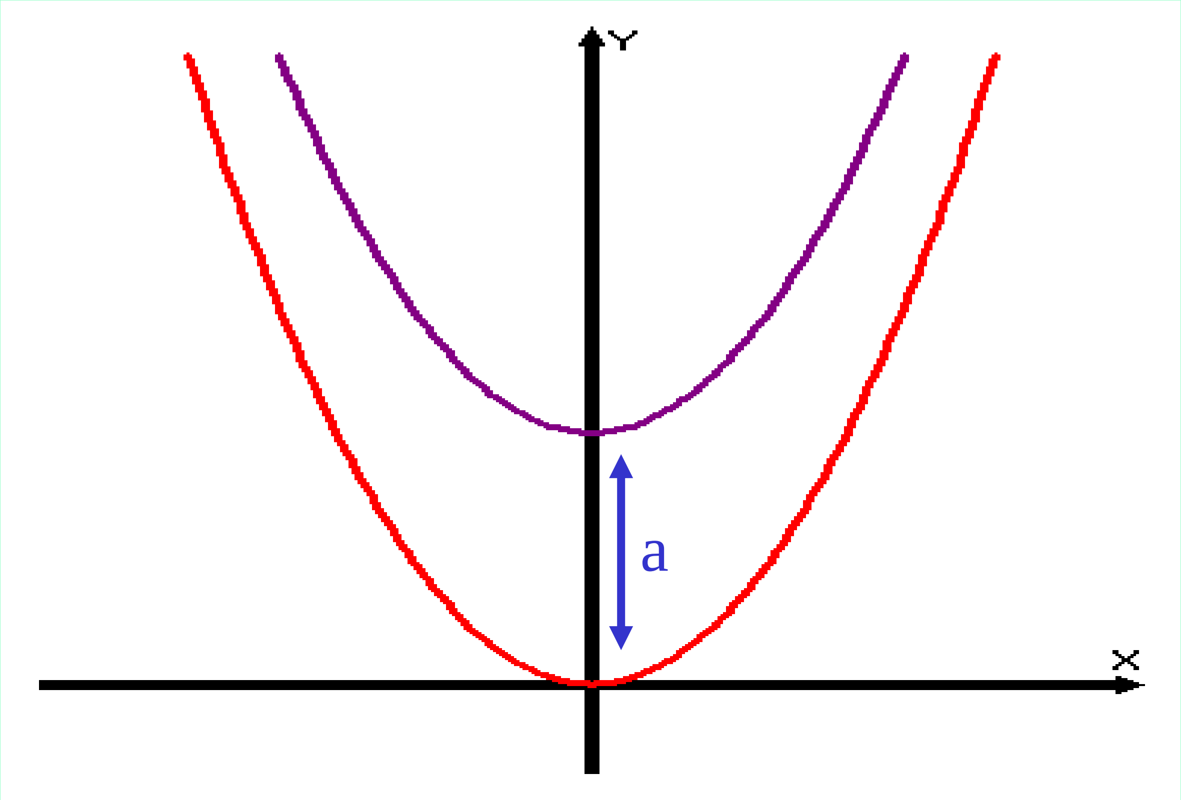
Graph of y = f(x) + a

Copy the following:

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

Upwards if a is positive

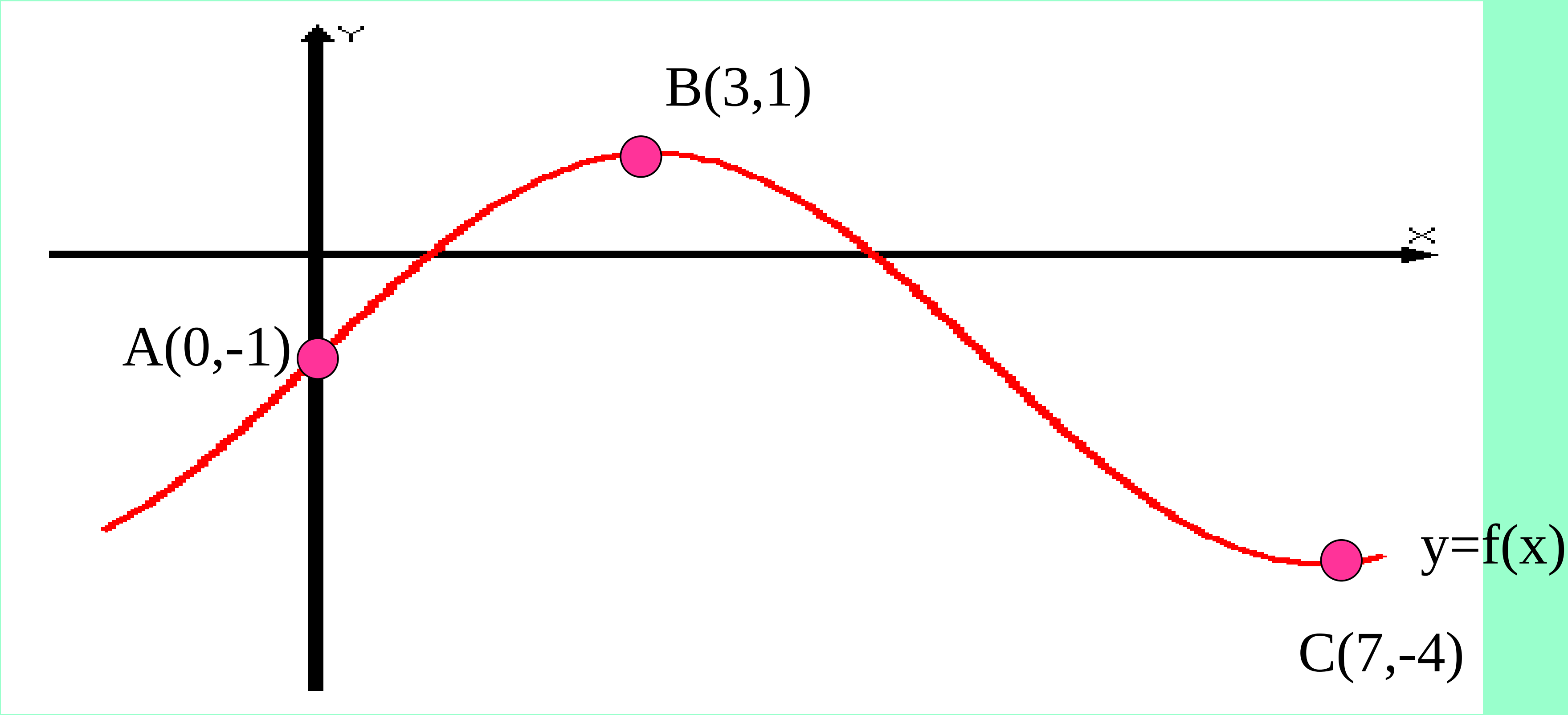
Downwards if a is negative



Example

Shown is the graph of f(x).

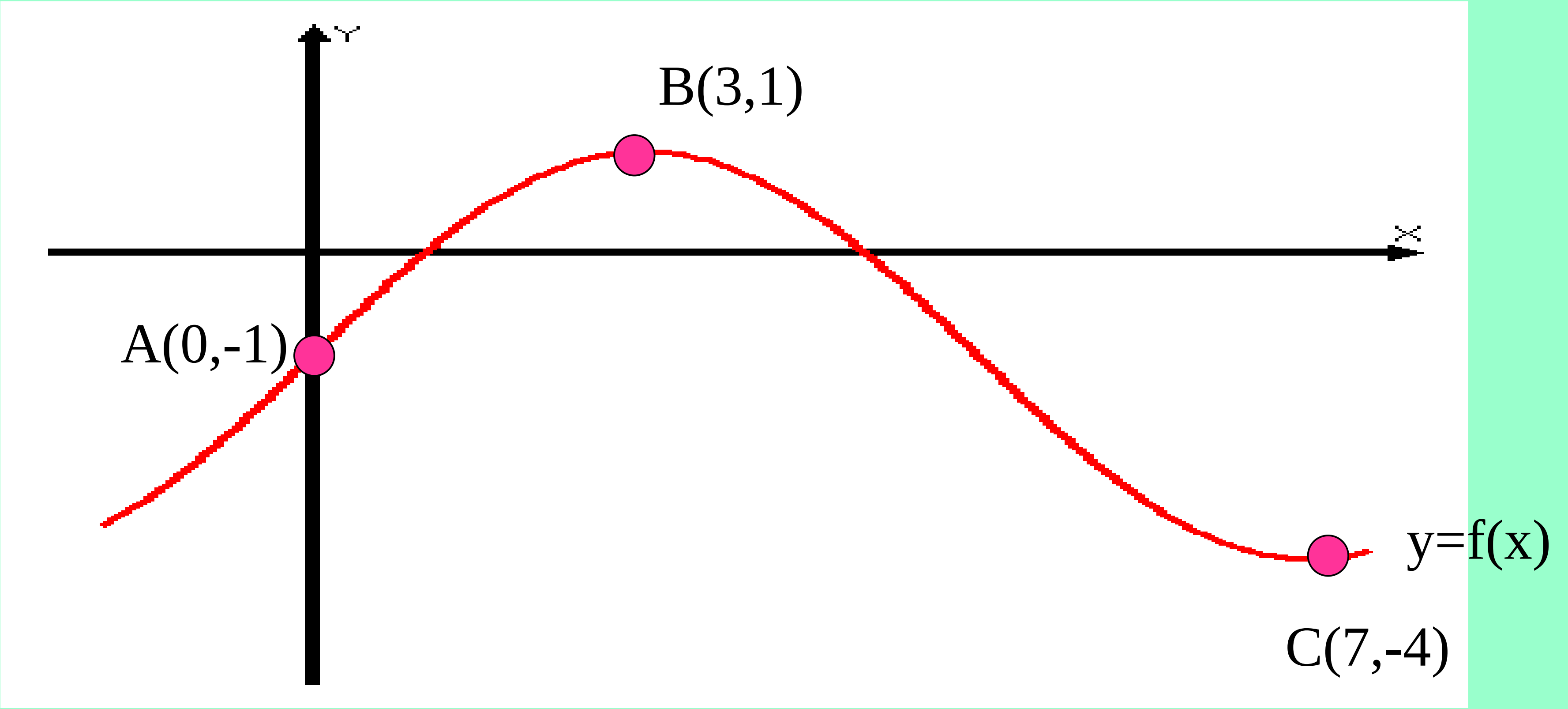
Sketch the graph of f(x) + 2, clearly annotating the images of A, B and C.



Solution:

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

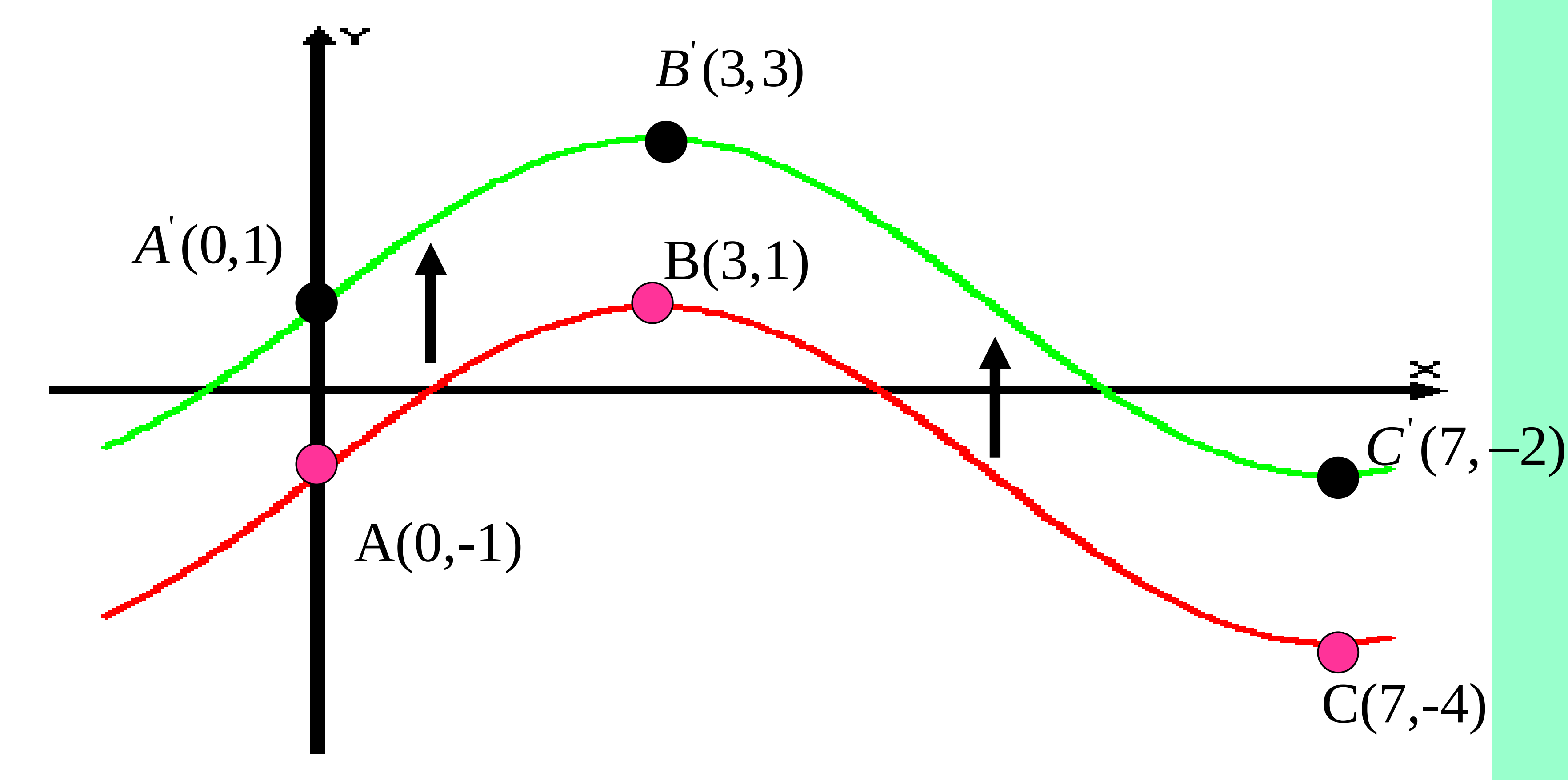
$A(0,-1) \rightarrow A'(0,1)$ $B(3,1) \rightarrow B'(3,3)$ $C(7,-4) \rightarrow C'(7,-2)$



Solution:

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

$$A(0,-1) \rightarrow A^{'}(0,1) \qquad B(3,1) \rightarrow B^{'}(3,3) \qquad C(7,-4) \rightarrow C^{'}(7,-2)$$



Heinemann, p.38, EX 3C,
Q 3 & 4