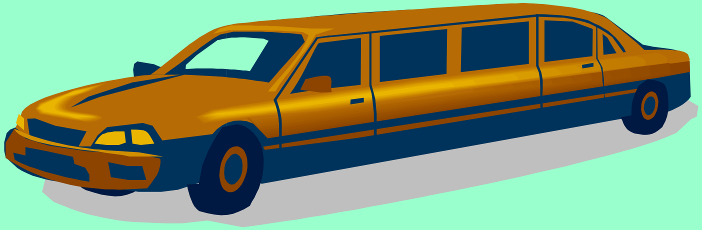


13.

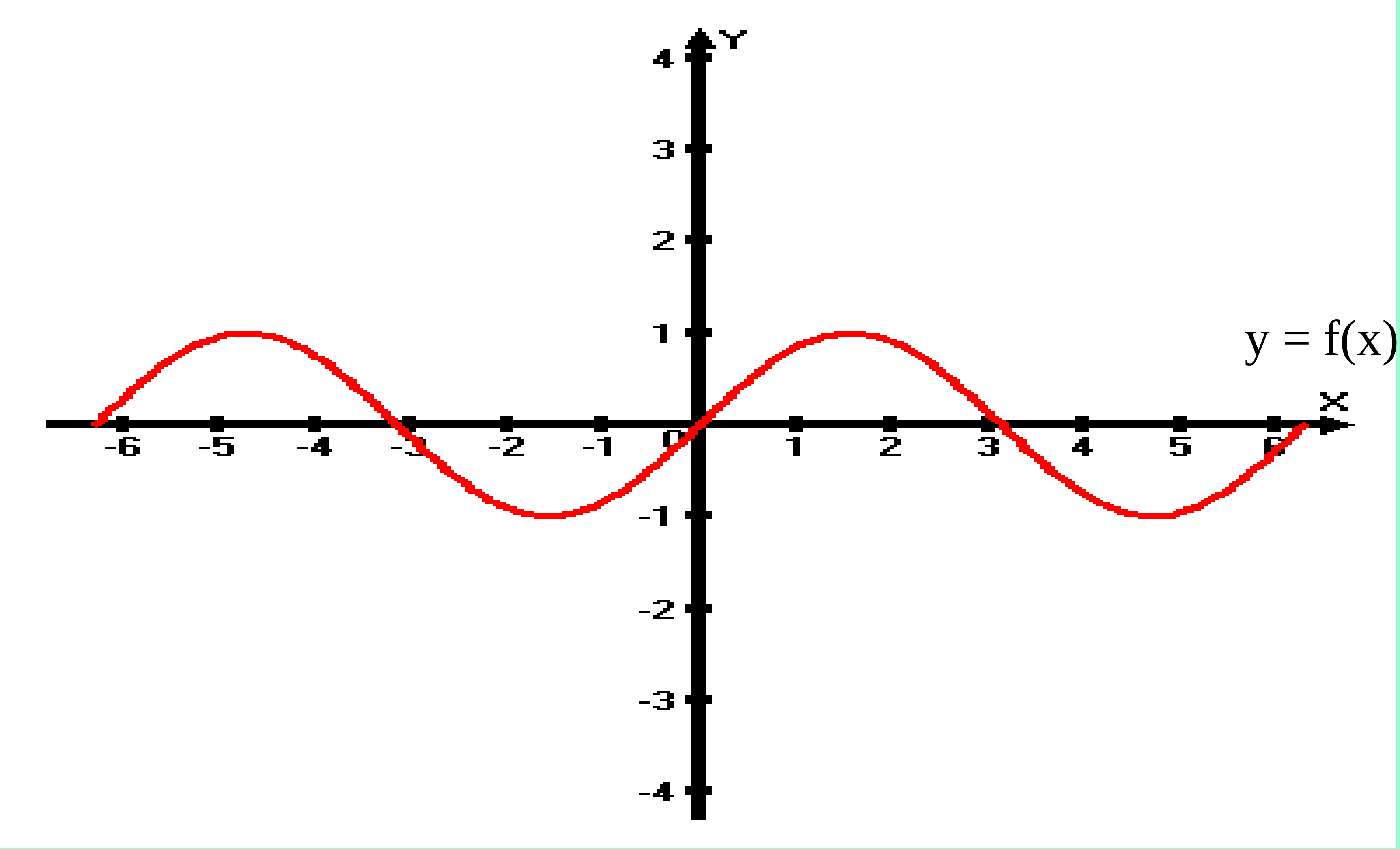
Graph of f(kx)

Graph of f(kx)

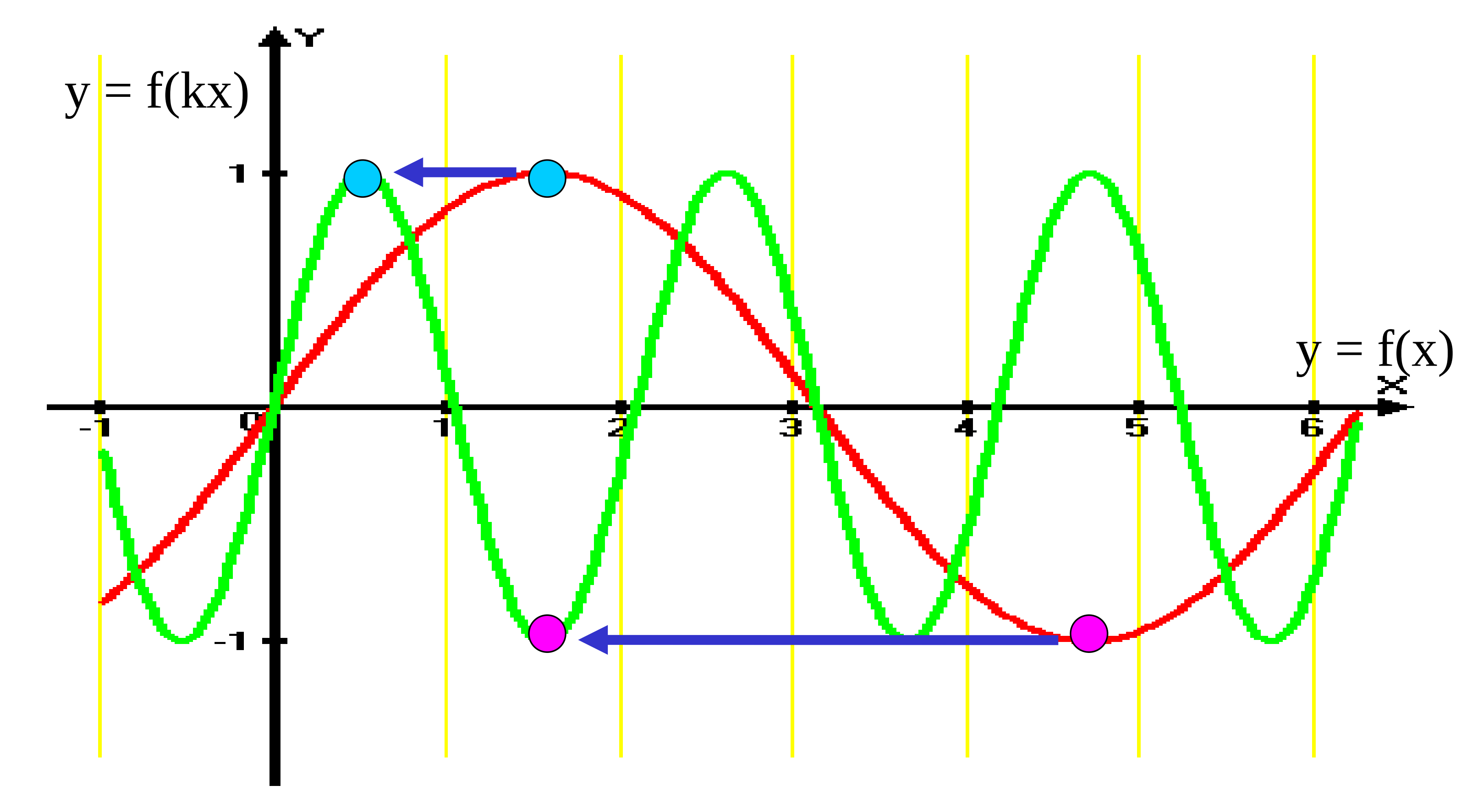
We are now going to look at what happens to f(x) if we multiply the X-values by a given constant.

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

Once again we will start with the function y = sin(x) as trig graphs illustrate the effects most clearly:



What will happen if we change this to y = sin(3x) ?



EFFECT : The y-coordinates are unchanged for corresponding points
but the x-coordinates have been divided by a factor of k.
The graph has not moved up or down.

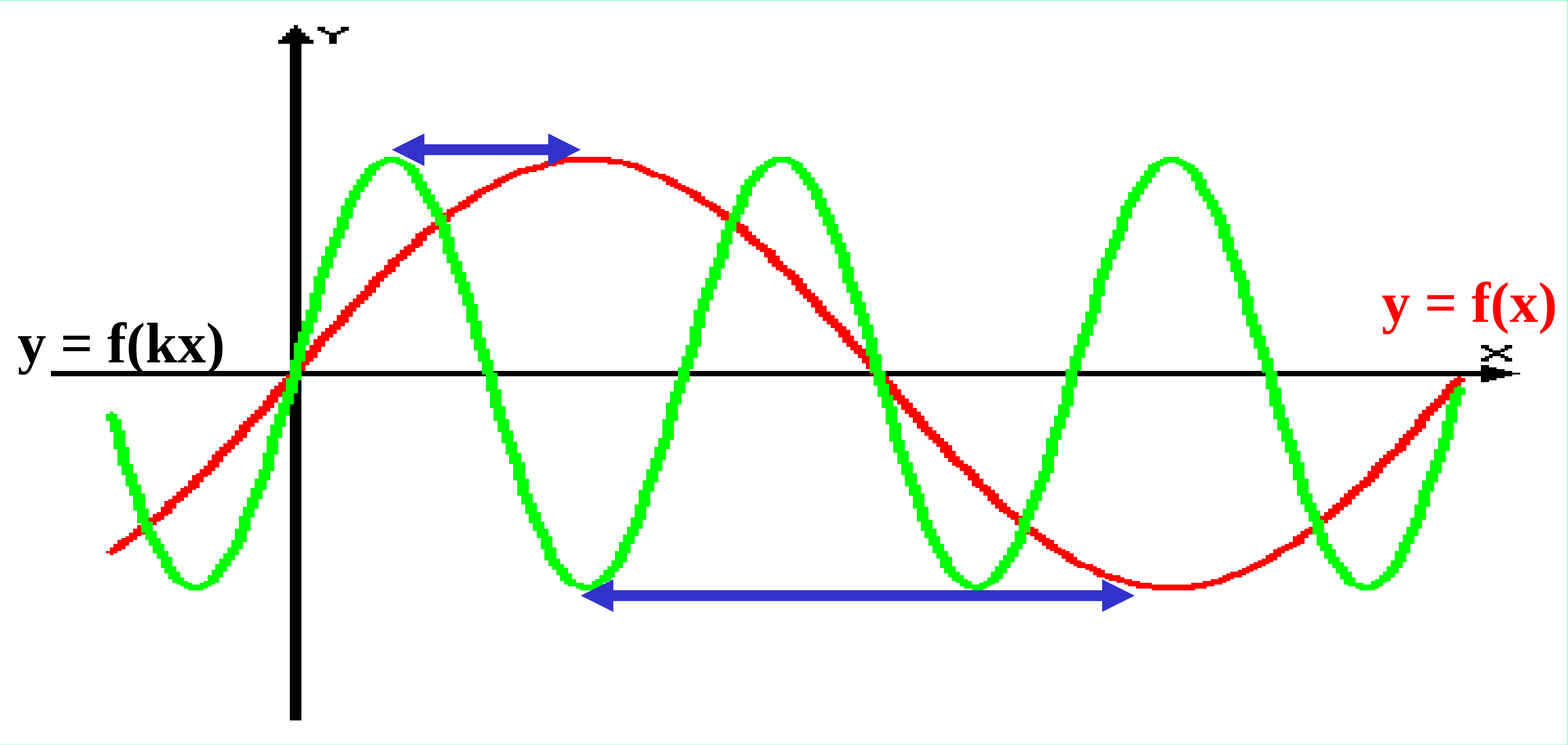
Graph of y = f(kx)

Copy the following:

To obtain graph of **y = f(kx)** the graph is compressed by a factor of **k**.

Divide the x-coordinate by k: $(a,b) \rightarrow (\frac{a}{k}, b)$

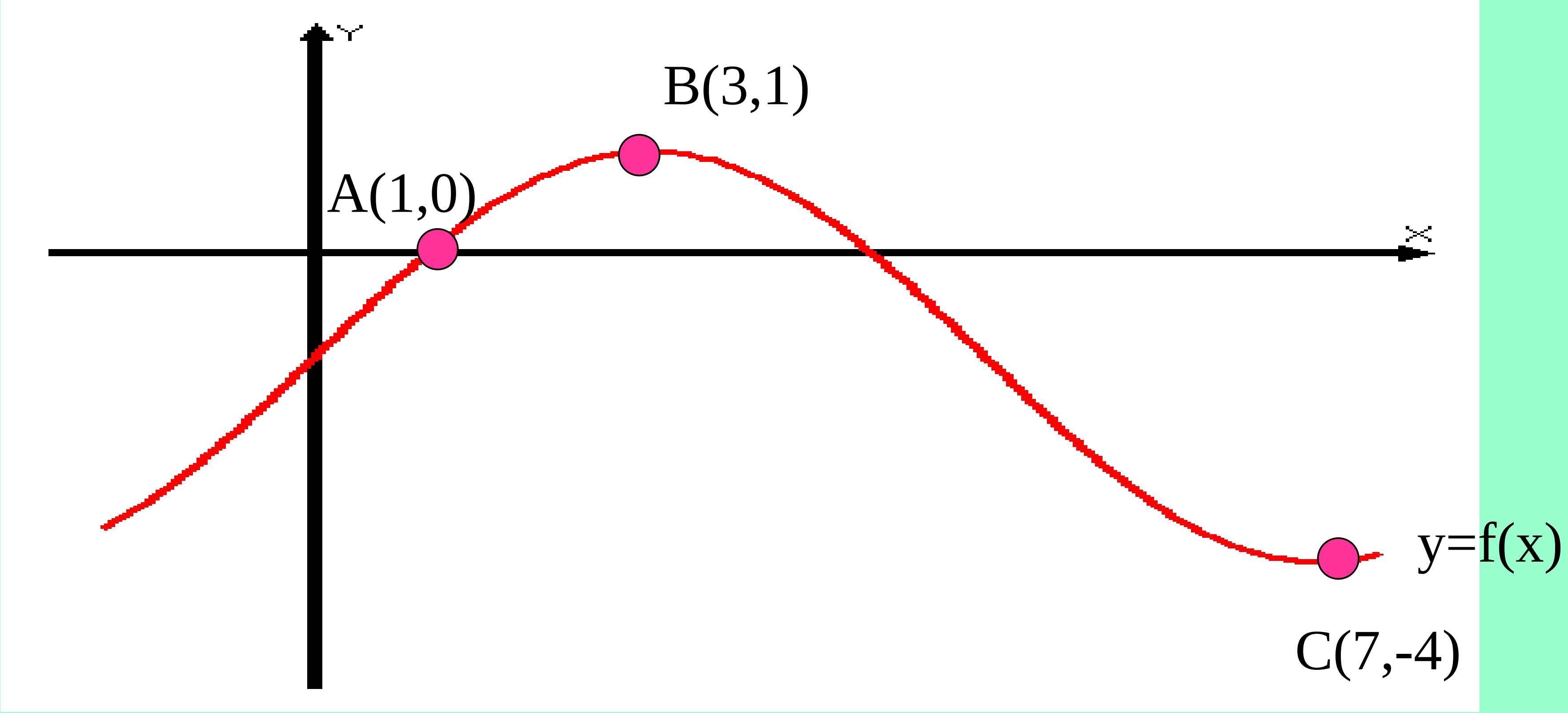
NOTE: If k > 1 then graph compressed If k < 1 then graph stretched



Example

Shown is the graph of f(x).

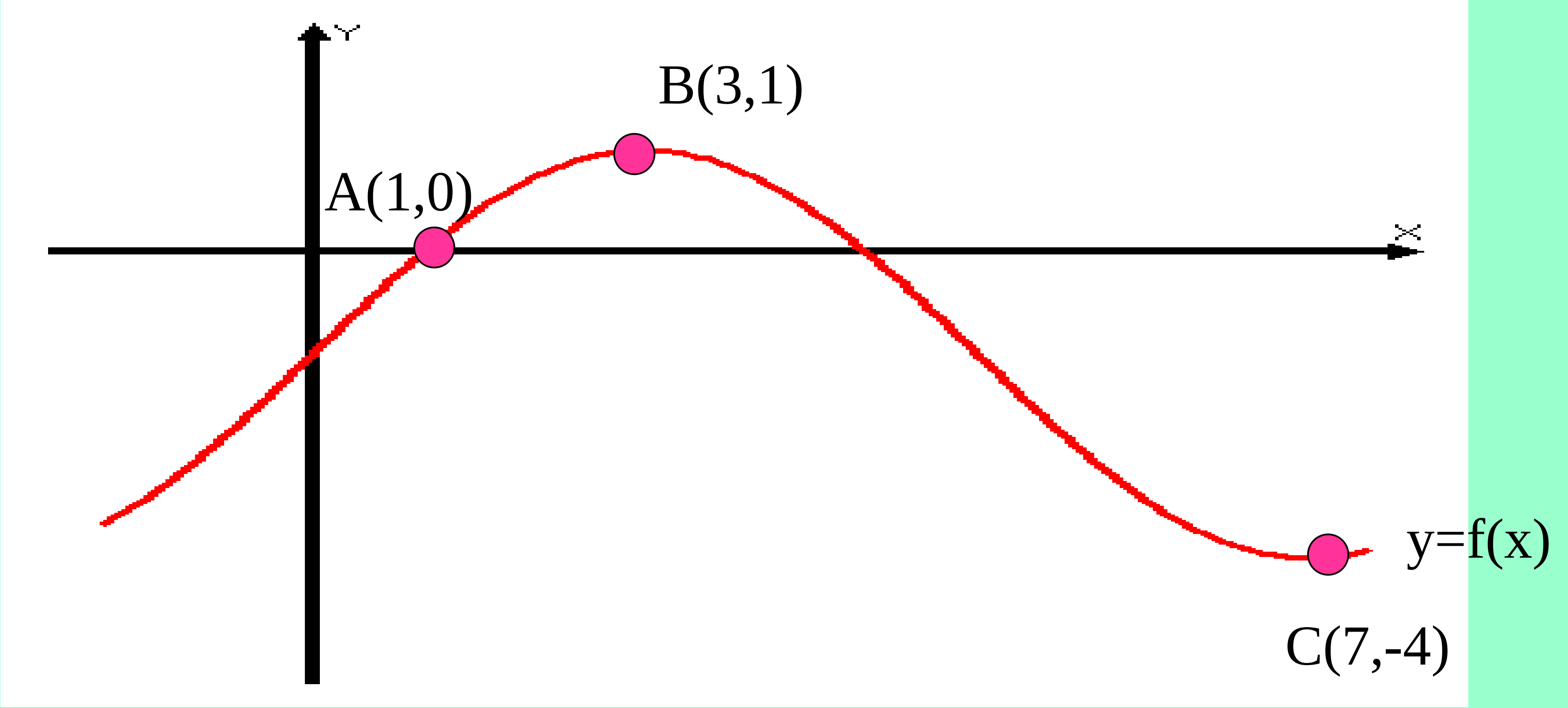
Sketch the graph of f(0.5x), clearly annotating the images of A, B and C.



Solution:

As required graph is y = f(0.5x) we **divide** each x-coordinate by 0.5.

$A(1,0) \to A^{'}(2,0) \qquad B(3,1) \to B^{'}(6,1) \qquad C(7,-4) \to C^{'}(14,-4)$



Solution:

As required graph is y = f(0.5x) we **divide** each x-coordinate by 0.5.

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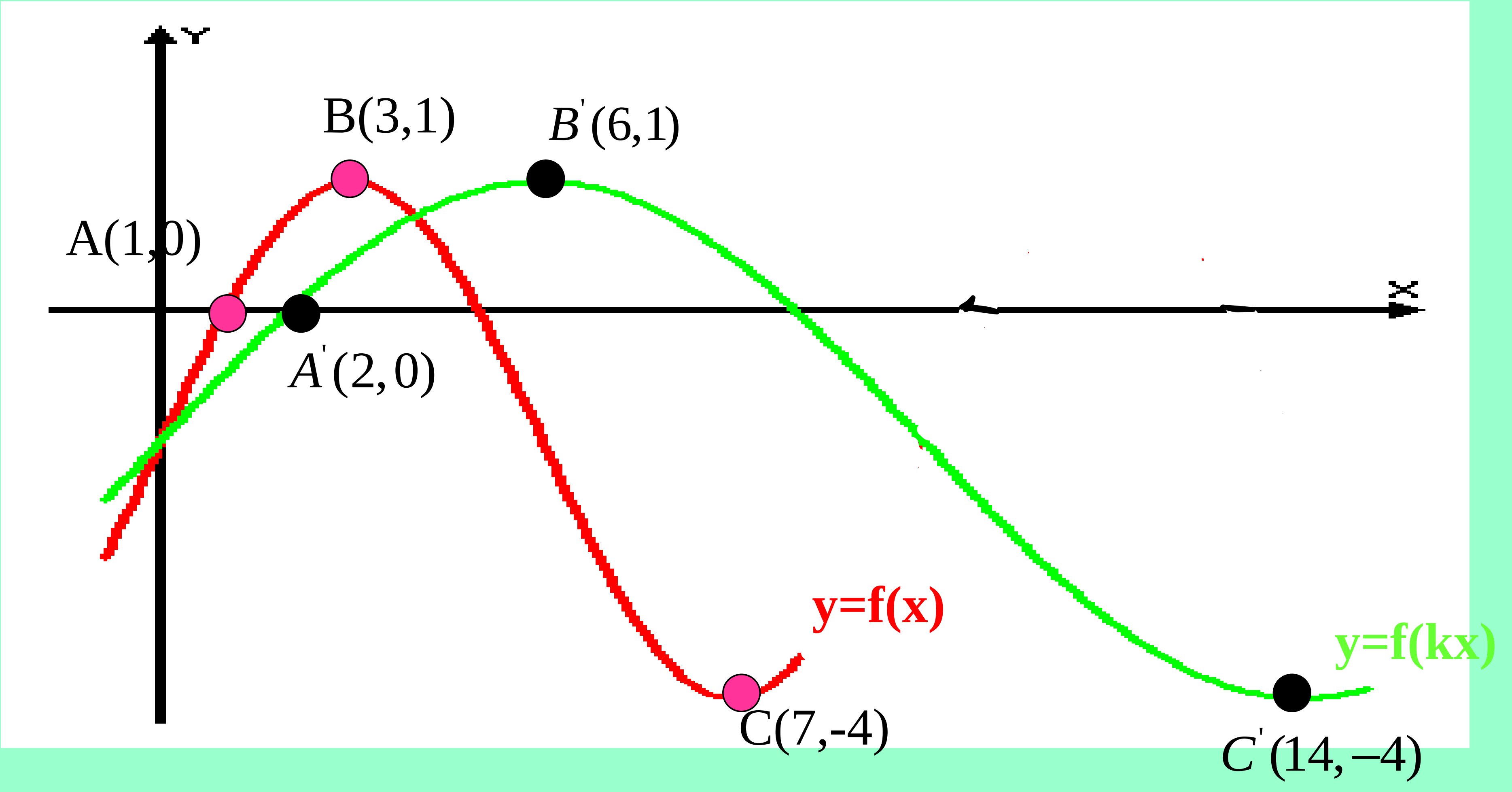

Heinemann, p.45, Ex 3M