Stretching quadratics

A LEVEL LINKS
Scheme of work: 1f. Transformations – transforming graphs – f(x) notation

Stretching graphs

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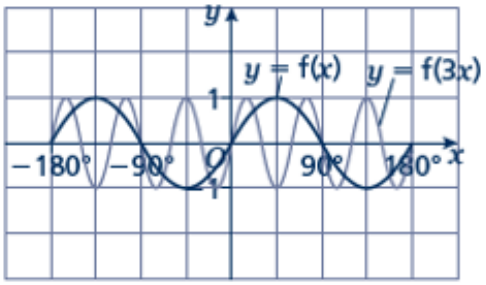
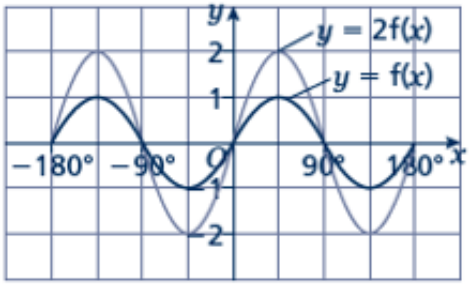
Textbook: Pure Year 1, 4.6 Stretching graphs

Key points

- The transformation $y = f(ax)$ is a horizontal stretch of $y = f(x)$ with scale factor $\frac{1}{a}$ parallel to the x-axis.



- The transformation $y = af(x)$ is a vertical stretch of $y = f(x)$ with scale factor a parallel to the y-axis.



Pearson
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Practice questions

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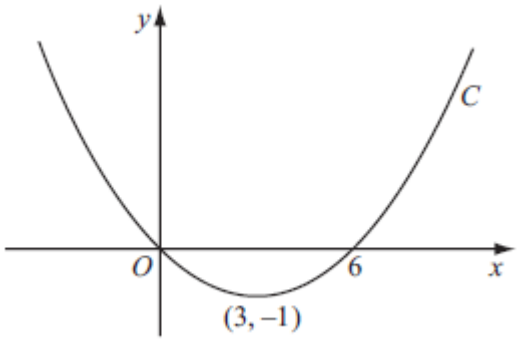


Figure 1

Figure 1 shows a sketch of the curve C with equation $y = f(x)$.
The curve C passes through the origin and through (6, 0).
The curve C has a minimum at the point (3, –1).

On separate diagrams, sketch the curve with equation

(*a*) $y = f(2x)$,

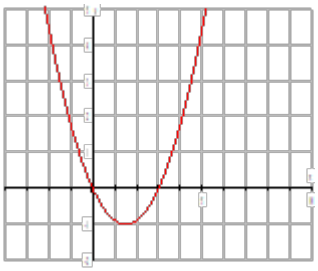
(*b*) $y = -f(x)$,

(*c*) $y = f(x + p)$, where p is a constant and $0 < p < 3$.

On each diagram show the coordinates of any points where the curve intersects the x-axis and of any minimum or maximum points.

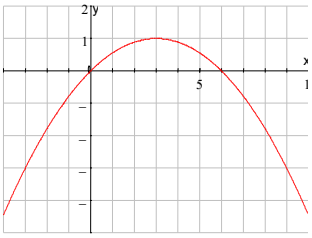
Answer

(a)



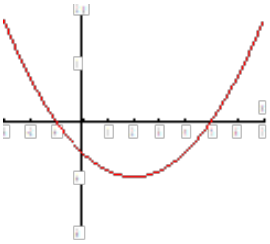
(3, 0) (1.5, –1)

(b)



(0, 0) and (6, 0) (3, 1)

(c)



$(-p, 0)$ and $(6 - p, 0)$

$(3 - p, -1)$