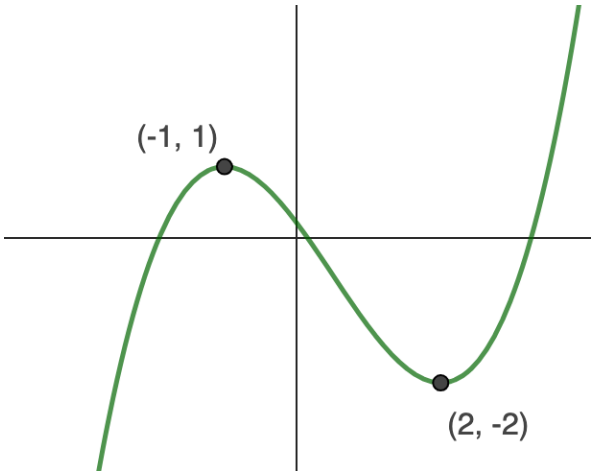
# Higher Maths question bank :: Paper 1

**20. Transforming graphs**

1. The graph of some cubic function $f$ is shown. It has stationery points at (-1, 1) and (2, -2).




State the coordinates of the stationery points for each of the following curves:

a) $y = 2f(x)$.

b) $y = 3f(x) - 2$.

c) $y = \frac{1}{2}f(x) + \frac{5}{2}$.

d) $y = f(x - 1)$.

e) $y = f(x + 2) - 1$.

f) $y = f(2x) + 1$.

g) $y = f(2x + 1) - 3$.

h) $y = 5f(\frac{1}{2}x + \frac{1}{2})$.

i) $y = 3f(2x - 1) + 5$.

j) $y = -2f(x) + 7$.

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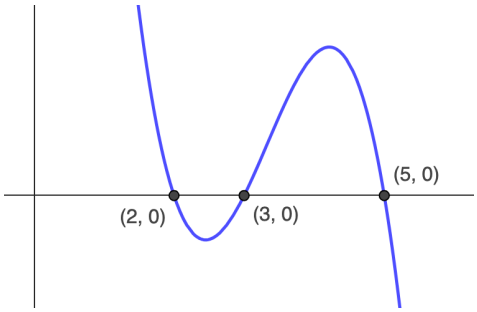
2. The graph of some cubic function $g$ is shown. It crosses the x-axis at $x = 2, 3$ and $5$.




For each of the following transformations, sketch the new curve and clearly state the x-coordinate where the curve intercepts the x-axis.

a) $f(x-1)$.

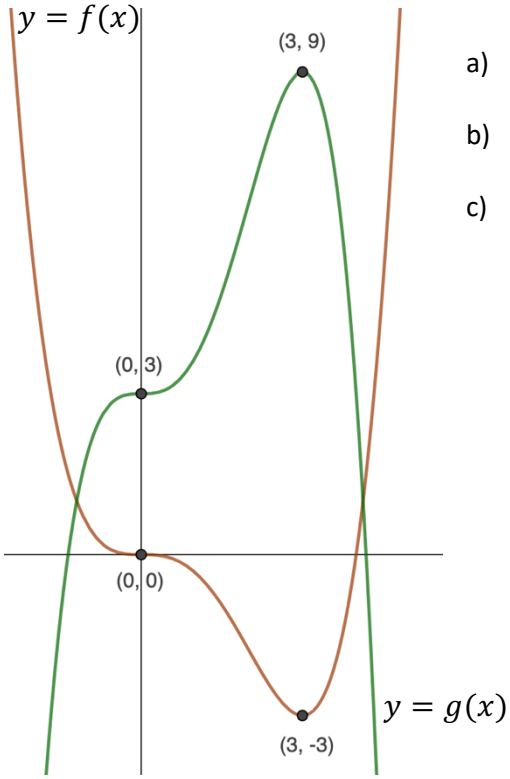
b) $f(2x)$.

c) $f(x+3)$.

d) $f\left(\frac{1}{2}x\right)$.

e) $f(-x)$.

3. The graphs of quartic functions $f(x)$ and $g(x) = k\,f(x) + a$ are shown.




a) State the value of $a$.

b) State the value of $k$.

c) Given $f(4) = 0$, state $g(4)$.

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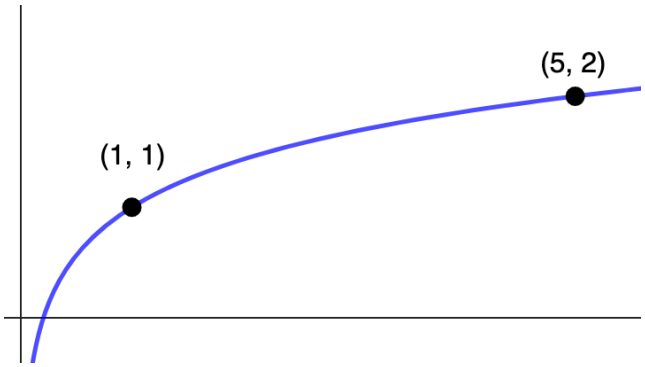
4. The graph of $f(x) = \log_b(x) + c$ is shown.




a) i) State the value of $c$.

ii) State the value of $b$.

b) Function $g(x) = -f(x) + 4$.

i) Express $g(x)$ in terms of $x$.

ii) Sketch $g(x)$.

iii) Determine the point of intersection of $f(x)$ and $g(x)$.