

Transformations of graphs

4 questions · 32 marks

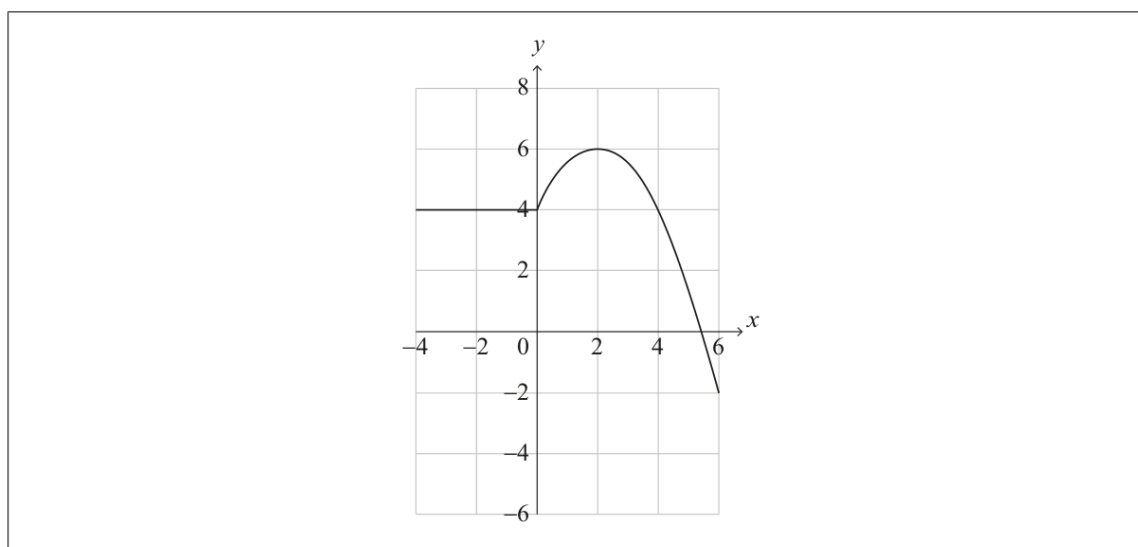
Answer all questions. The marks available are shown against each part. Every question is taken unaltered from a past paper; the source is noted beneath it. Some questions are taken from higher level papers, where they examine the same standard level content.

1.

[Maximum mark: 5]

5 marks

The graph of $y = f(x)$ for $-4 \leq x \leq 6$ is shown in the following diagram.



(a) Write down the value of

(i) $f(2)$;

(ii) $(f \circ f)(2)$.

[2]

(b) Let $g(x) = \frac{1}{2}f(x) + 1$ for $-4 \leq x \leq 6$. On the axes above, sketch the graph of g .

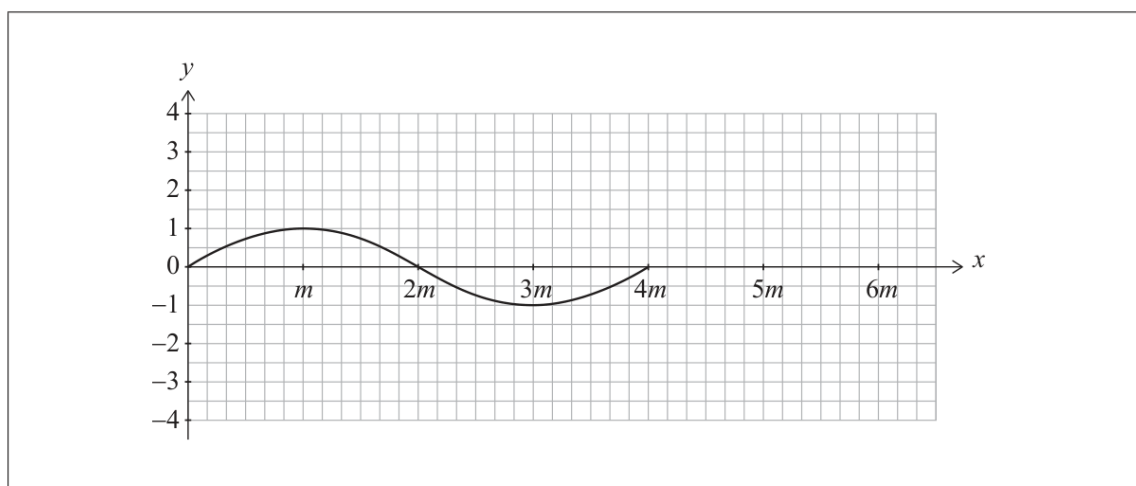
[3]

2.

[Maximum mark: 6]

6 marks

The function f is defined by $f(x) = \sin qx$, where $q > 0$. The following diagram shows part of the graph of f for $0 \leq x \leq 4m$, where x is in radians. There are x -intercepts at $x = 0, 2m$ and $4m$.



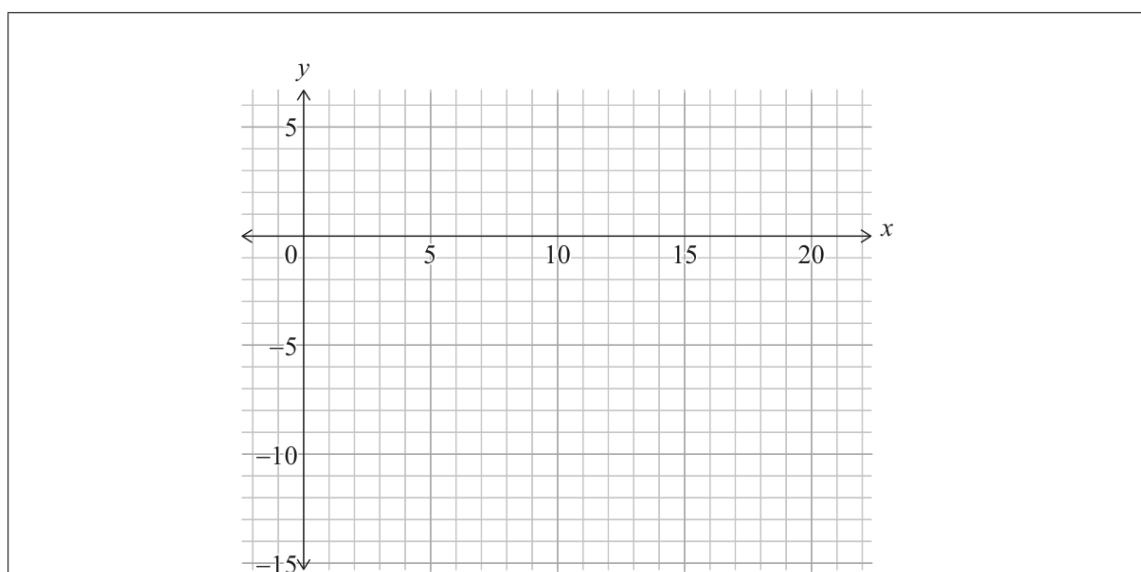
- (a) Find an expression for m in terms of q . [2]

The function g is defined by $g(x) = 3\sin \frac{2qx}{3}$, for $0 \leq x \leq 6m$.

- (b) On the axes above, sketch the graph of g . [4]

7 marks

[3]



14 marks

(d) Describe these two transformations specifying the order in which they are to be applied. [6]
