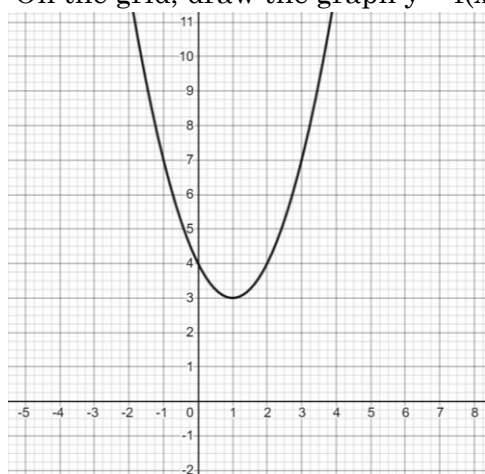




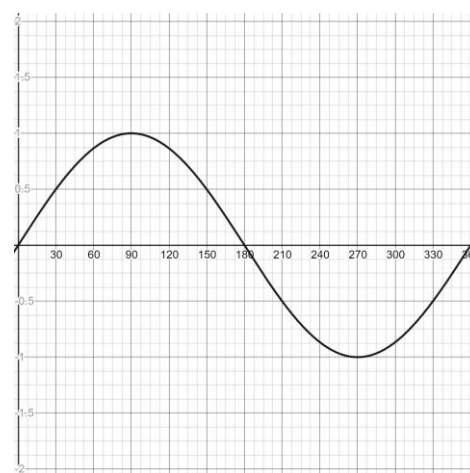
## Transforming Graphs of Functions Exam Practice

1. The graph below shows a sketch of  $y = f(x)$ .  
On the grid, draw the graph  $y = f(x+3) - 2$ .



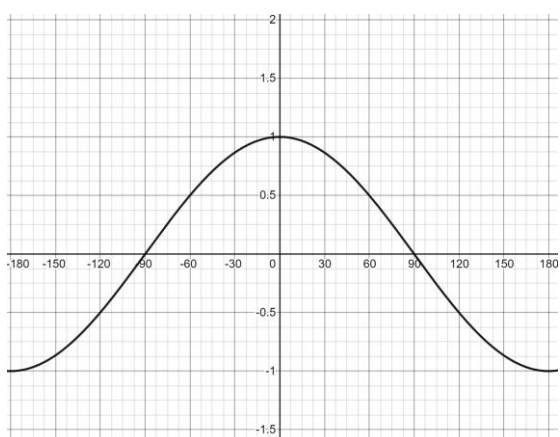
(2 marks)

2. The graph below shows a sketch of  $y = f(x)$ .  
On the grid, draw the graph  $y = f(2x)$ .



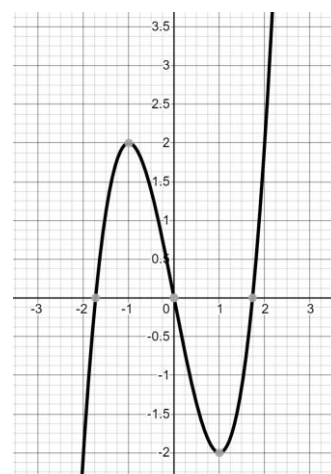
(2 marks)

3. The graph below shows a sketch of  $y = f(x)$ .  
On the grid, draw the graph  $y = -\frac{1}{2}f(x)$ .



(2 marks)

4. The graph below shows a sketch of  $y = f(x)$ .  
On the grid, draw the graph  $y = f(-x)$ .



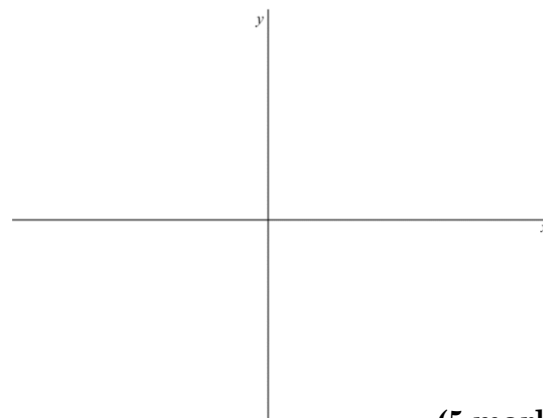
(2 marks)

5. Let  $f(x) = 2x^2 + 4x - 5$ . Describe fully the single transformation which takes  $f(x)$  to each of the following graphs.

- (i)  $g(x) = 2x^2 + 4x + 7$
- (ii)  $h(x) = 2x^2 - 4x + 7$
- (iii)  $k(x) = 8x^2 + 8x - 5$

6. On the grid below sketch the following graphs, clearly indicating any asymptotes:

a)  $y = \frac{1}{x}$    b)  $y = -\frac{1}{x+1}$



(5 marks)

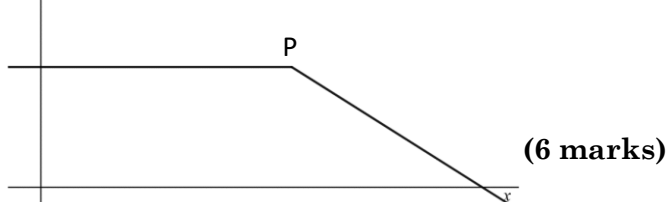


7. Let  $f(x)$  be the graph below. The vertex P has coordinates (8, 3). Work out the coordinates of the vertex in each of the following cases:

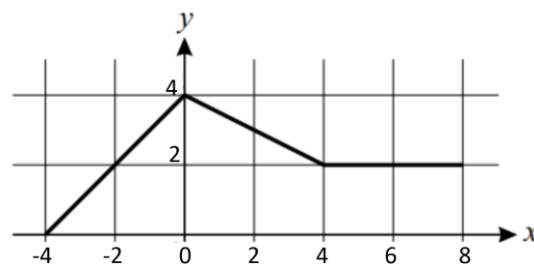
(i)  $g(x) = f(x - 4)$

(ii)  $g(x) = f\left(\frac{1}{3}x\right)$

(iii)  $g(x) = -2f(x)$



8. The graph below shows a sketch of  $y = f(x)$  which is defined for  $-4 \leq x \leq 8$ .



a) Write down the value of  $f(5.5)$  [1]

b) Let  $g(x) = f(-x)$ . Find the value of  $g(-2)$ . [1]

c) Let  $h(x)$  be such that  $h(-4) = 0$  &  $h(4) = 6$ . Describe fully a possible transformation which takes  $f(x)$  to  $h(x)$ . [3]

9. The graph of  $y = 5^x$  can be transformed into the graph of  $y = 5^{x-2}$  by two different transformations. Describe each of these transformations fully.

(4 marks)

10. Let  $f_0(x) = \sin(x)$ ,  $f_{n+1}(x) = 2f_n(x + 30^\circ)$  be an iteration formula for a sequence of functions.

a) Sketch  $f_3(x)$  on the axes for  $0 \leq x \leq 360^\circ$



b) Solve the equation  $f_{12}(x) = 1000$  for  $0 \leq x \leq 90^\circ$  to 1 d.p. [2]

Q11. Let  $f(x) = 4x^3 + 10$ . Determine the function  $g(x)$  which  $f(x)$  is mapped onto in each of the following cases:

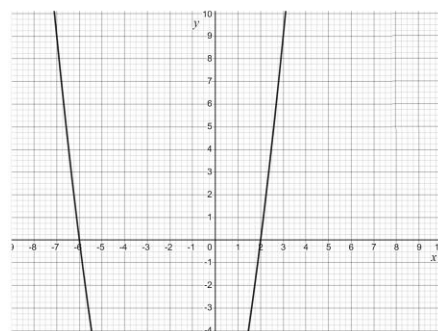
(i) translation by the vector  $\begin{pmatrix} -3 \\ -4 \end{pmatrix}$

(ii) reflection in the  $y$ -axis

(iii) stretch in the  $x$ -direction scale factor  $\frac{1}{3}$

(6 marks)

Q12. Below is part of a quadratic graph  $y = f(x)$ , which has turning point P. The transformed graph  $g(x) = f(2x) + 25$  has turning point Q. The  $y$  coordinate of Q is 9. Find the full co-ordinates of P and Q.



(4 marks)