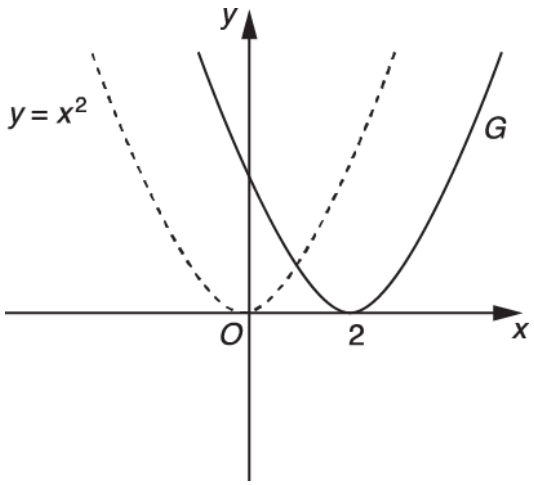
1. The axes below show the graph of $y = x^2$ and a translation of this graph, *G*.



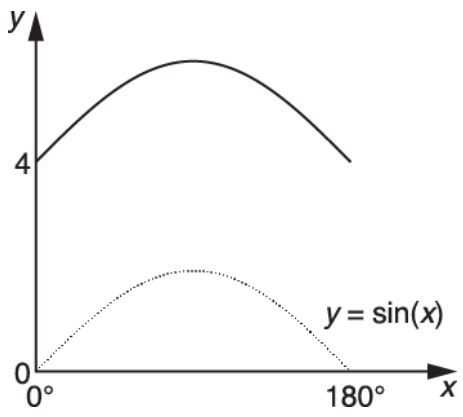
Write down the equation of graph *G*.

---

[1]

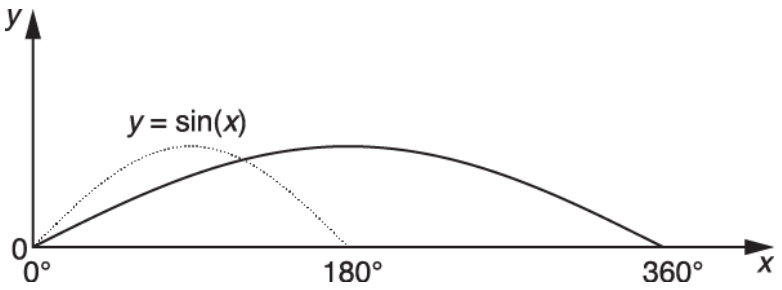
2. In each part, write down the equation of the transformed graph.

(i)



(i) _____ [1]

(ii)

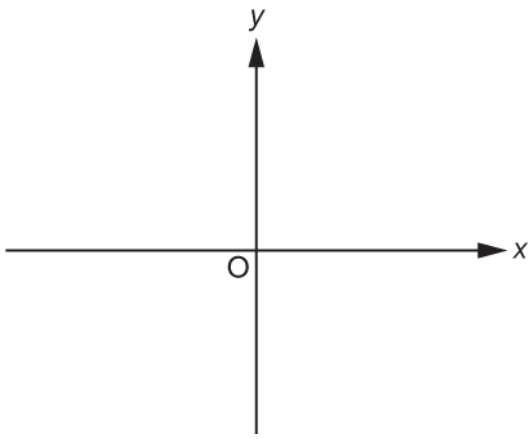


(ii) _____ [1]

3.

Sketch the graph of $y = (x - 2)^2 - 3$.

Show the coordinates of any turning points.



[3]

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Part marks and guidance	
1			$y = (x - 2)^2$	1		Do not accept $y = f(x - 2)$ Examiner's Comments This was rarely correct. The most common answer was $y = x^2 + 2$. The few candidates who realised that the translation affected the term to be squared often gave $y = (x + 2)^2$ as the solution. Some candidates tried to include $f(x)$ notation in their answer which was not accepted as it had not been used in the question.
			Total	1		
2		i	$y = \sin(x) + 4$	1		Examiner's Comments There were more correct answers. Most candidates realised that the answer would be a combination of sinx and 4 and proceeded to write them in various orders.
		ii	$y = \sin(\frac{1}{2}x)$	1		Accept $y = -\cos(\frac{1}{2}x)$ Examiner's Comments This was not answered well. Among others, $y = \sin(2x)$, $y = 2\sin(x)$ and $y = \frac{1}{2}\sin(x)$ were frequently seen wrong answers.
			Total	2		

Question			Answer/Indicative content	Marks	Part marks and guidance		
3			U shaped parabola with minimum value indicated at (2, –3)	3	**B1** for U shape curve **B1** for turning point at (2, *k*) **B1** for turning point at (*k*, –3)	Be generous for the U shape condone broken line Values must be shown but could be marked on axes. Mark intention Accept turning point = (2, –3) written in working provided no contradictio n on sketch If point (2, –3) only plotted on graph and no sketch then B0B1B1	
					Examiner's Comments In part (a) 1 mark was often awarded for a sketch of a U shape graph. The minimum was rarely at the correct point, with (0, –3) being the more popular turning point. A number of candidates created a table of values in an attempt to draw an accurate graph rather than a sketch.		
			Total	3			