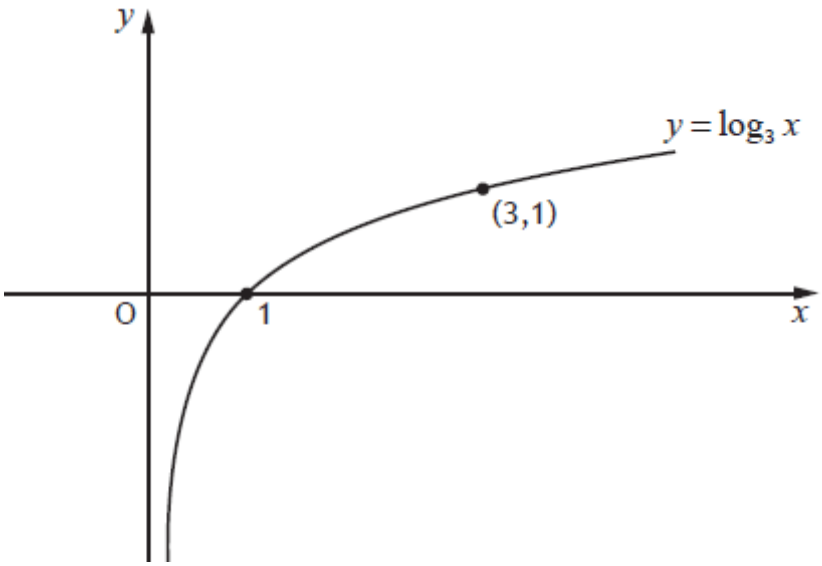
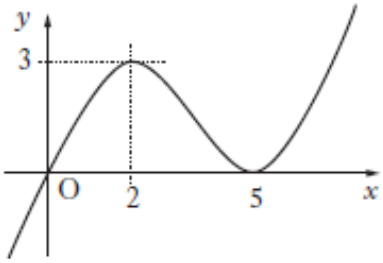
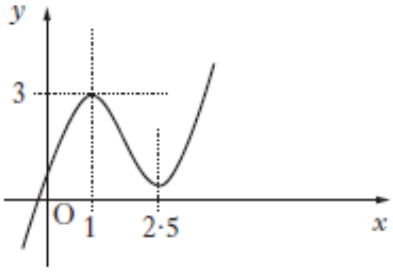
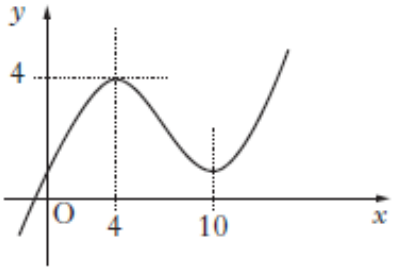
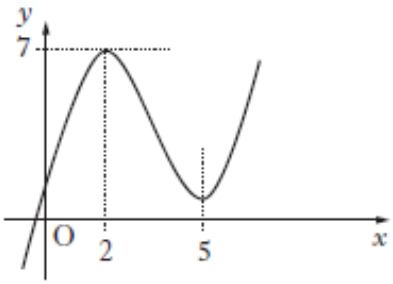
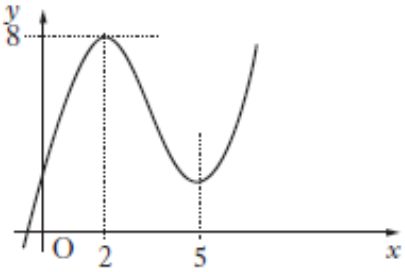
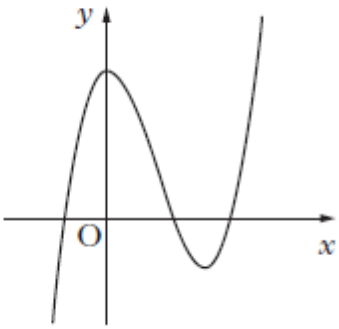
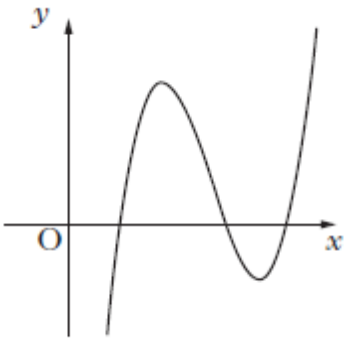
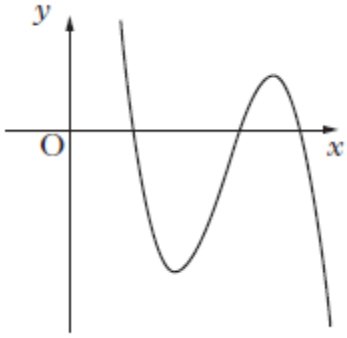
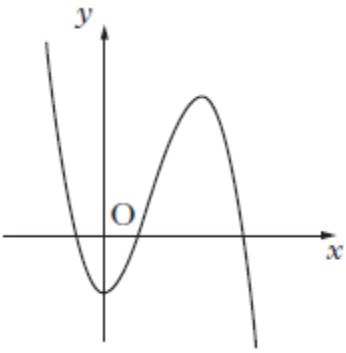
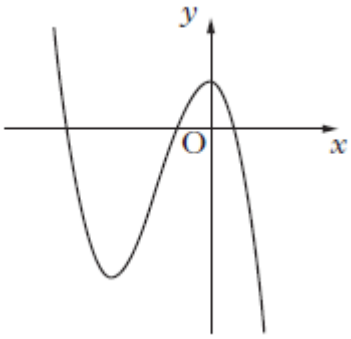
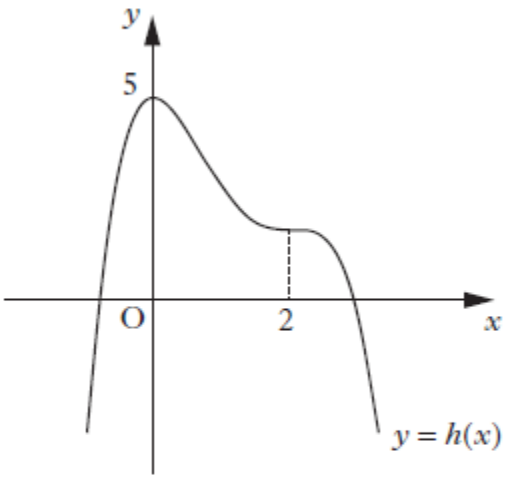
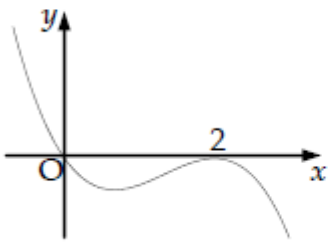
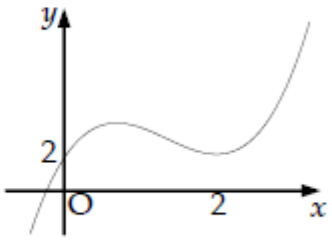
Higher : Graphs of Functions

2018 P1 Q11(a)	The diagram shows the curve with equation $y = \log_3 x$.  (a) On the diagram in your answer booklet, sketch the curve with equation $y = 1 - \log_3 x$.	2
Ans	*Curve reflected in the x-axis and moved vertically up by 1 unit*	
2015 P1 Q20	The only stationary point on the graph of $y = f(x)$ is the point (a, b). What are the coordinates of the only stationary point on the graph of $y = -f(2x)$? A $\left(\frac{1}{2}a, -b\right)$ B $(2a, -b)$ C $\left(-\frac{1}{2}a, b\right)$ D $(-2a, b)$	2
Ans	*A*	

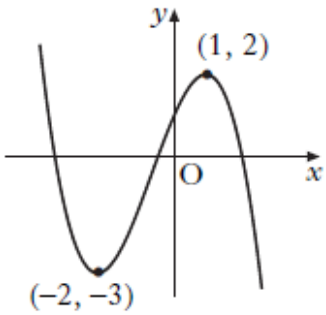
2014 P1 Q11	The diagram shows part of the graph of $y = f(x)$.  Which of the following diagrams could be the graph of $y = 2f(x) + 1$? A  B  C  D  	2
Ans	*C*	

2013 P1 Q11	The diagram shows a cubic curve with equation $y = f(x)$.  Which of the following diagrams could show the curve with equation $y = -f(x - k)$, $k > 0$? A  B  C  D  	2
Ans	*B*	

2012 P2 Q4	The diagram below shows the graph of a quartic $y = h(x)$, with stationary points at $x = 0$ and $x = 2$.  On separate diagrams sketch the graphs of: (*a*) $y = h'(x)$; (*b*) $y = 2 - h'(x)$.	3 3
Ans	Graph for (a)  Graph for (b)  	

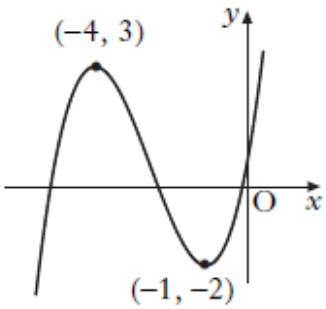
2011 P1 Q3

The diagram shows the graph of $y = f(x)$.

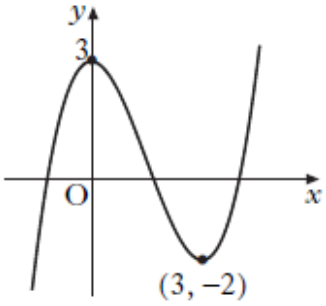


Which of the following shows the graph of $y = f(x + 2) - 1$?

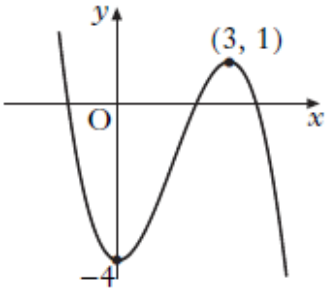
A



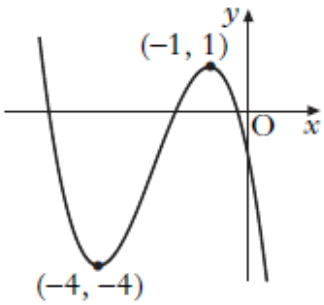
B



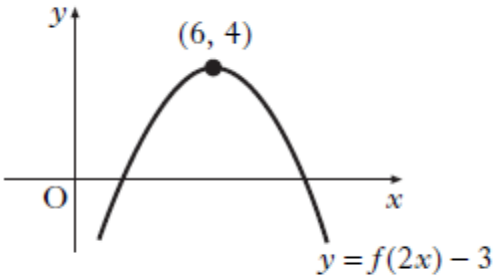
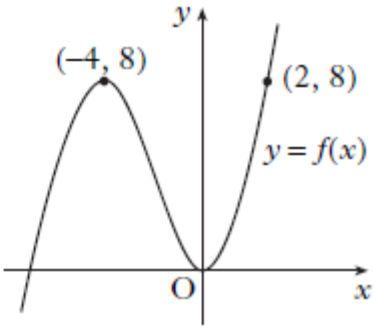
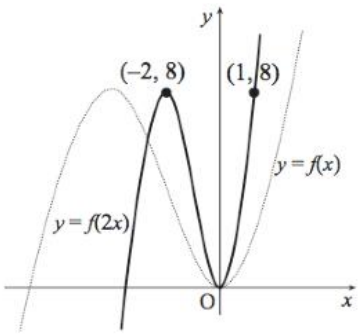
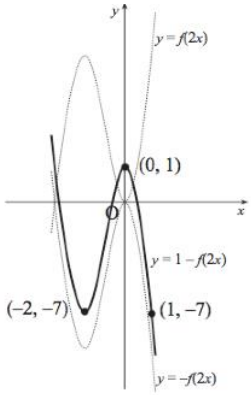
C



D

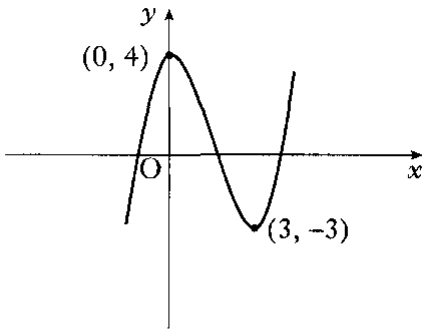


2

Ans	*D*	
2010 P1 Q20	The diagram shows the graph of $y = f(2x) - 3$.  What are the coordinates of the turning point on the graph of $y = f(x)$? A (12, 7) B (12, 1) C (3, 7) D (3, 1)	2
Ans	*A*	
2009 P1 Q23	The diagram shows a sketch of the function $y = f(x)$. (*a*) Copy the diagram and on it sketch the graph of $y = f(2x)$. (*b*) On a separate diagram sketch the graph of $y = 1 - f(2x)$.  	2 3
Ans	*(a)*  *(b)*  	

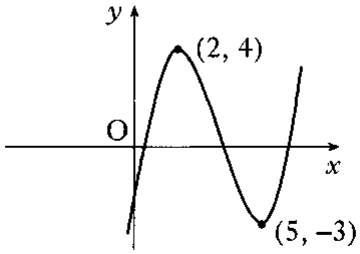
2008 P1 Q8

The diagram shows part of the graph of a function with equation $y = f(x)$.

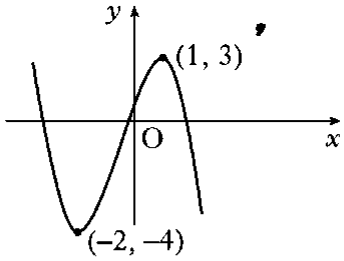


Which of the following diagrams shows the graph with equation $y = -f(x - 2)$?

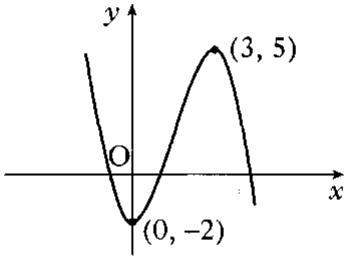
A



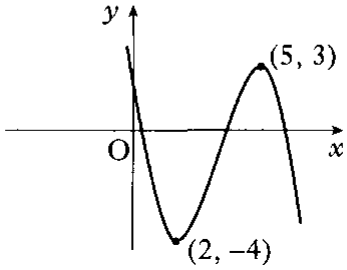
B



C

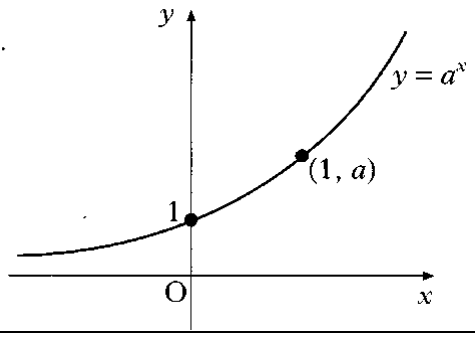
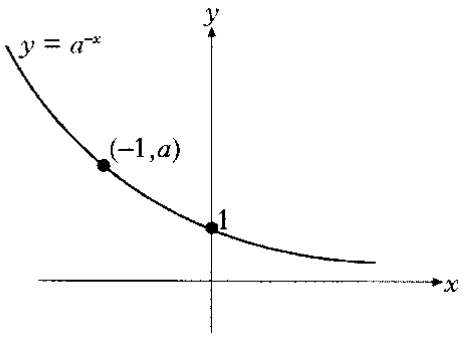
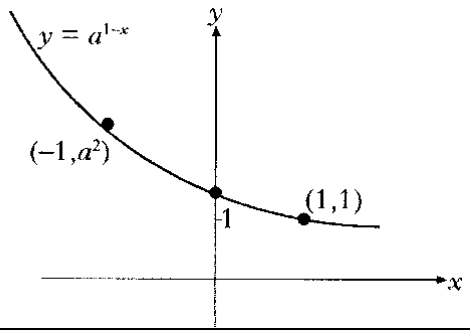
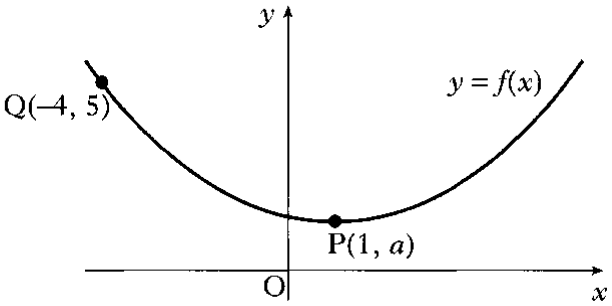
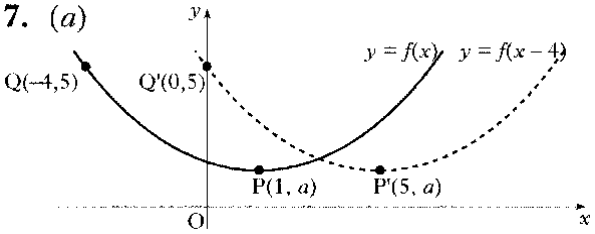
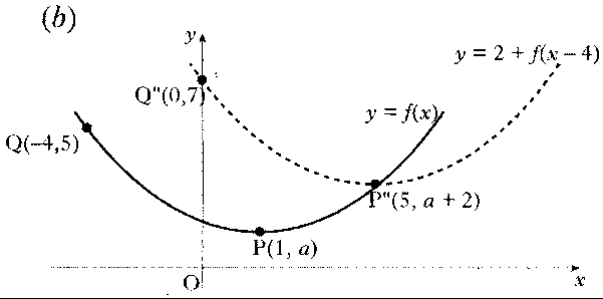
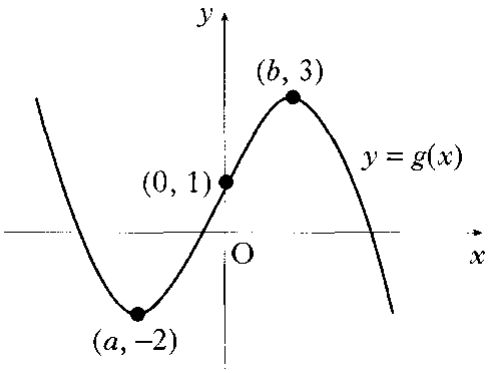


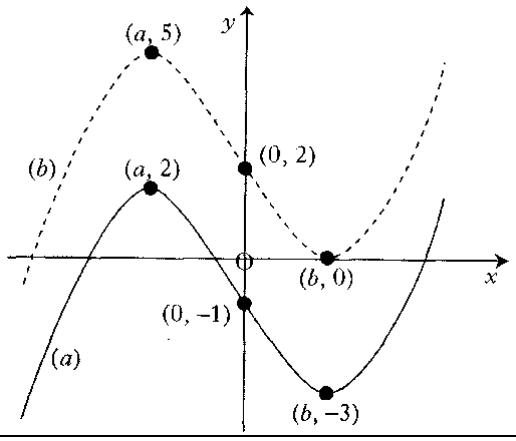
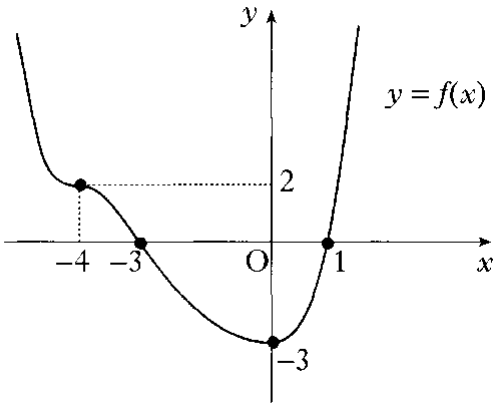
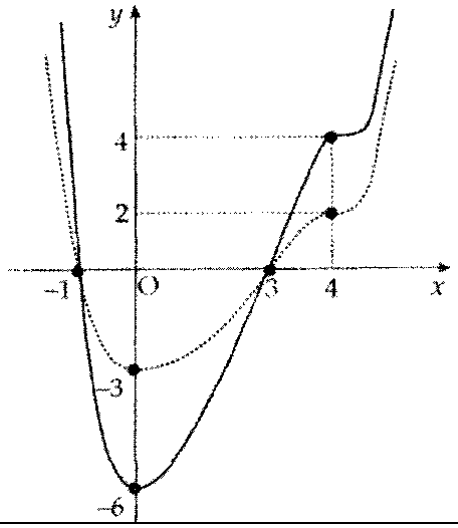
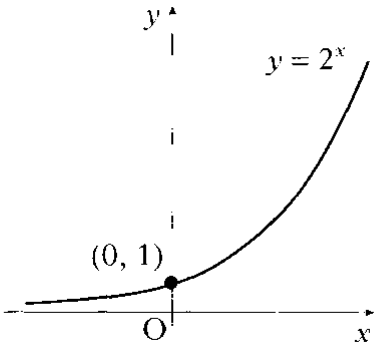
D

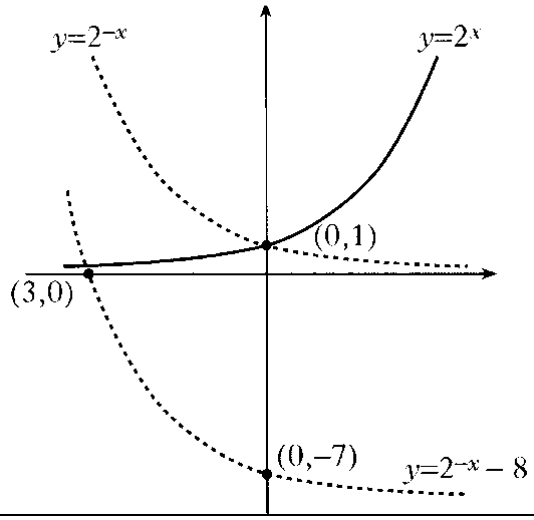
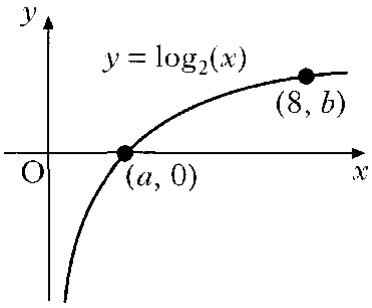
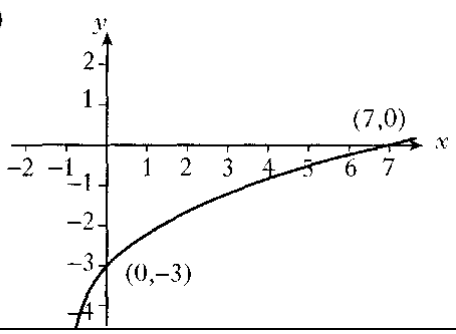


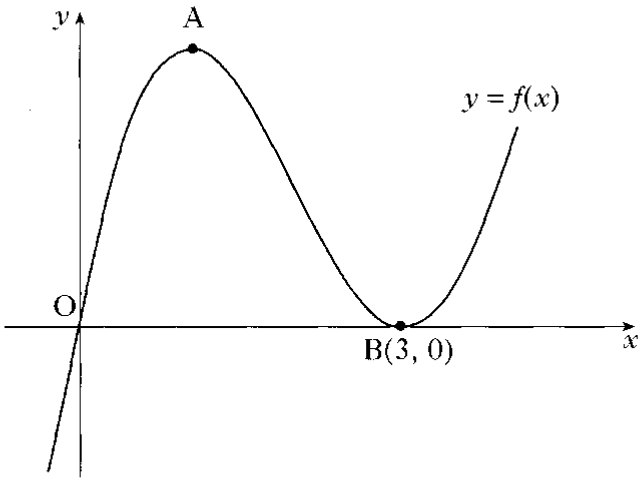
2

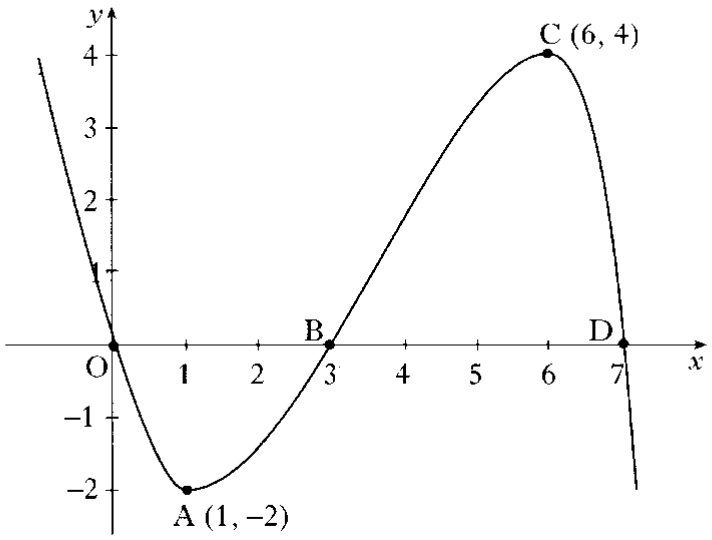
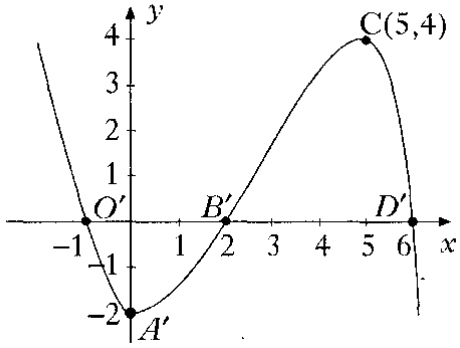
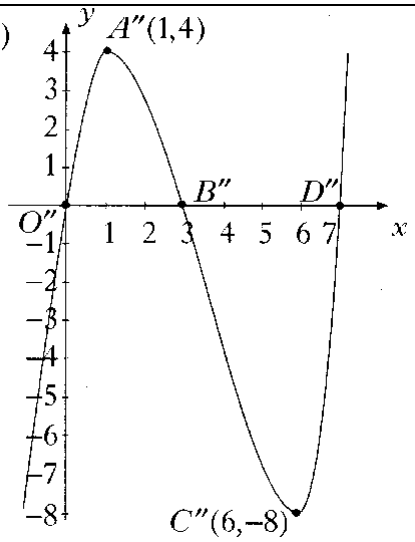
Ans *D*

2007 P2 Q9	The diagram shows the graph of $y = a^x$, $a > 1$. On separate diagrams, sketch the graphs of: (*a*) $y = a^{-x}$; (*b*) $y = a^{1-x}$.  	2 2
Ans	(*a*)  (*b*)  	
2006 P2 Q7	The diagram shows the graph of a function $y = f(x)$. Copy the diagram and on it sketch the graphs of: (*a*) $y = f(x - 4)$; (*b*) $y = 2 + f(x - 4)$.  	2 2
Ans	**7.** (*a*)  (*b*)  	
2004 P1 Q4	The diagram shows the graph of $y = g(x)$. (*a*) Sketch the graph of $y = -g(x)$. (*b*) On the same diagram, sketch the graph of $y = 3 - g(x)$.  	2 2

Ans	(*a*) Reflect in x–axis. (*b*) Translate +3 parallel to y–axis  	
2003 P2 Q5	The diagram shows the graph of a function f. f has a minimum turning point at (0, –3) and a point of inflexion at (–4, 2). (*a*) Sketch the graph of $y = f(-x)$. (*b*) On the same diagram, sketch the graph of $y = 2f(-x)$.  	2 2
Ans	 	
2002W P1 Q8	The diagram shows part of the graph of $y = 2^x$. (*a*) Sketch the graph of $y = 2^{-x} - 8$. (*b*) Find the coordinates of the points where it crosses the x and y axes.  	2 2

Ans	. (*a*) & (*b*) Reflect graph in y-axis followed by a translation $\begin{pmatrix} 0 \\ -8 \end{pmatrix}$.  	
2002 P1 Q7	(*a*) Express $f(x) = x^2 - 4x + 5$ in the form $f(x) = (x - a)^2 + b$. (*b*) On the same diagram sketch: (i) the graph of $y = f(x)$; (ii) the graph of $y = 10 - f(x)$. (*c*) Find the range of values of x for which $10 - f(x)$ is positive.	2 4 1
Ans	(*a*) $x = 7$ (*b*) $3x + 2y = 23$ (*c*) (7, 1)	
2001 P1 Q10	The diagram shows a sketch of part of the graph of $y = \log_2(x)$. (*a*) State the values of a and b. (*b*) Sketch the graph of $y = \log_2(x + 1) - 3$.  	1 3
Ans	(*b*)  (*a*) $a = 1$, $b = 3$	

2000 P1 Q2	A sketch of the graph of $y = f(x)$ where $f(x) = x^3 - 6x^2 + 9x$ is shown below. The graph has a maximum at A and a minimum at B(3, 0).  (*a*) Find the coordinates of the turning point at A. (*b*) Hence sketch the graph of $y = g(x)$ where $g(x) = f(x + 2) + 4$. Indicate the coordinates of the turning points. There is no need to calculate the coordinates of the points of intersection with the axes. (*c*) Write down the range of values of k for which $g(x) = k$ has 3 real roots.	4 2 1
Ans	(*a*) A = (1,4) (*b*) $f(x)$ needs to be translated 4 units up, 2 units left Sketch with A′ at (–1,8) and B′ at (1,4) (*c*) $4 < k < 8$	

Specimen 2 P2 Q5	Part of the graph of $y = f(x)$ is shown in the diagram. On separate diagrams, sketch the graphs of (i) $y = f(x + 1)$ (ii) $y = -2f(x)$. Indicate on each graph the images of O, A, B, C and D.  	5
Ans	(i)  (ii)