

A/A* - Transformations of graphs



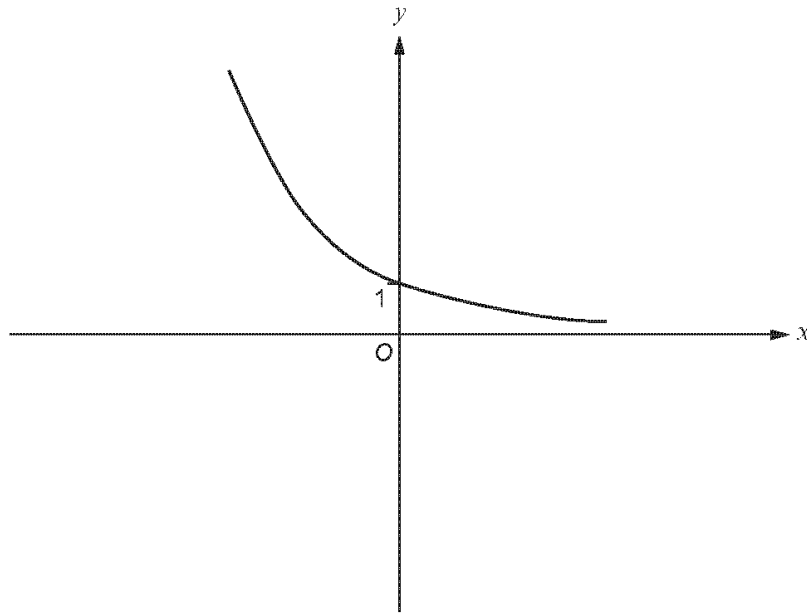
www.bit.do/AgradeTransformations

Question	Maximum Mark	Mark Awarded
1	4	
2	2	
3	4	
4	5	
5	2	
6	3	
Total Mark		

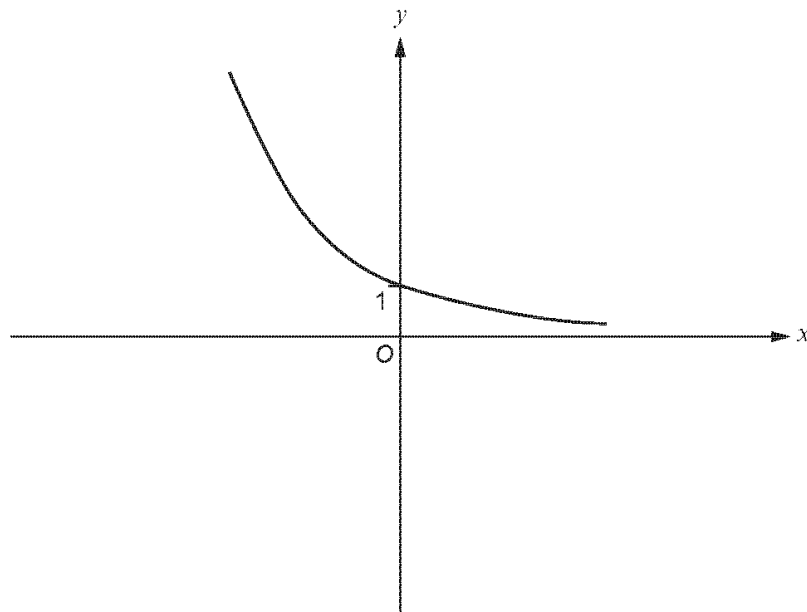


1.

- (a) The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x) - 5$.
Mark clearly the value of y at the point where your curve crosses the y -axis. [2]



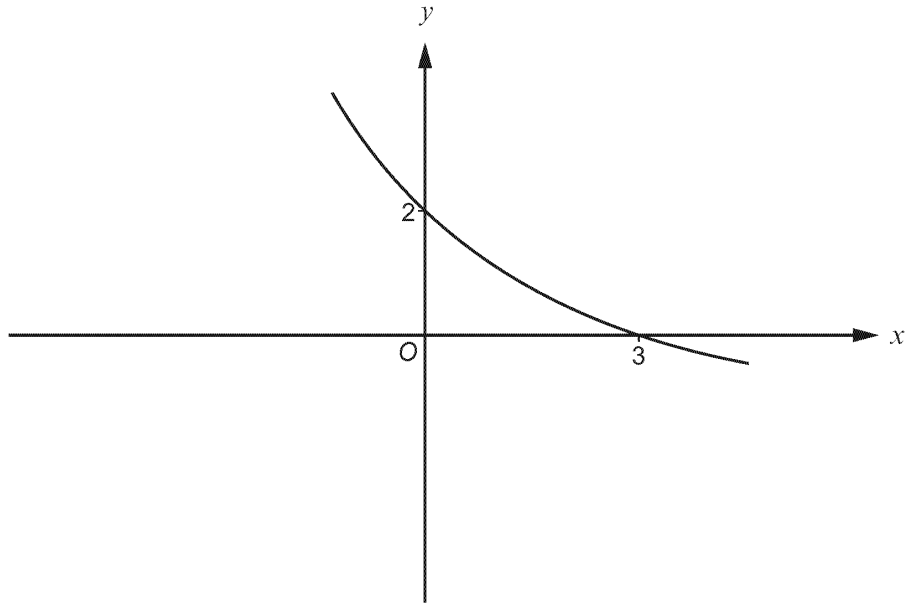
- (b) This diagram again shows a sketch of $y = f(x)$.
On this diagram, sketch the curve $y = -f(x)$.
Mark clearly the value of y at the point where your curve crosses the y -axis. [2]



2.

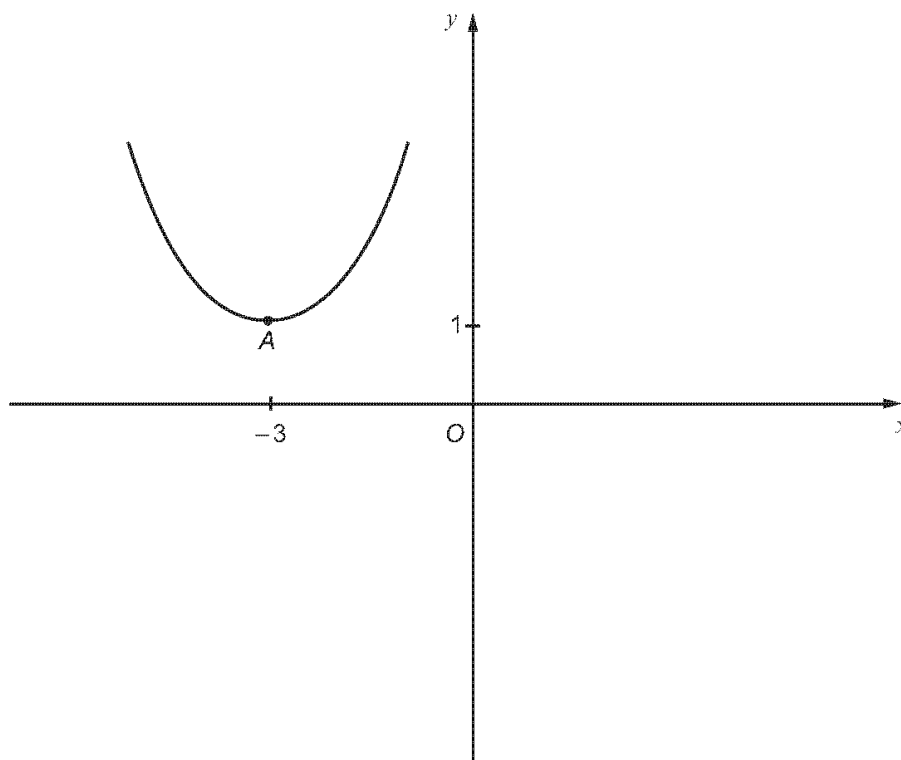
The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = -f(x)$.
Show clearly where this curve crosses the axes.

[2]



2

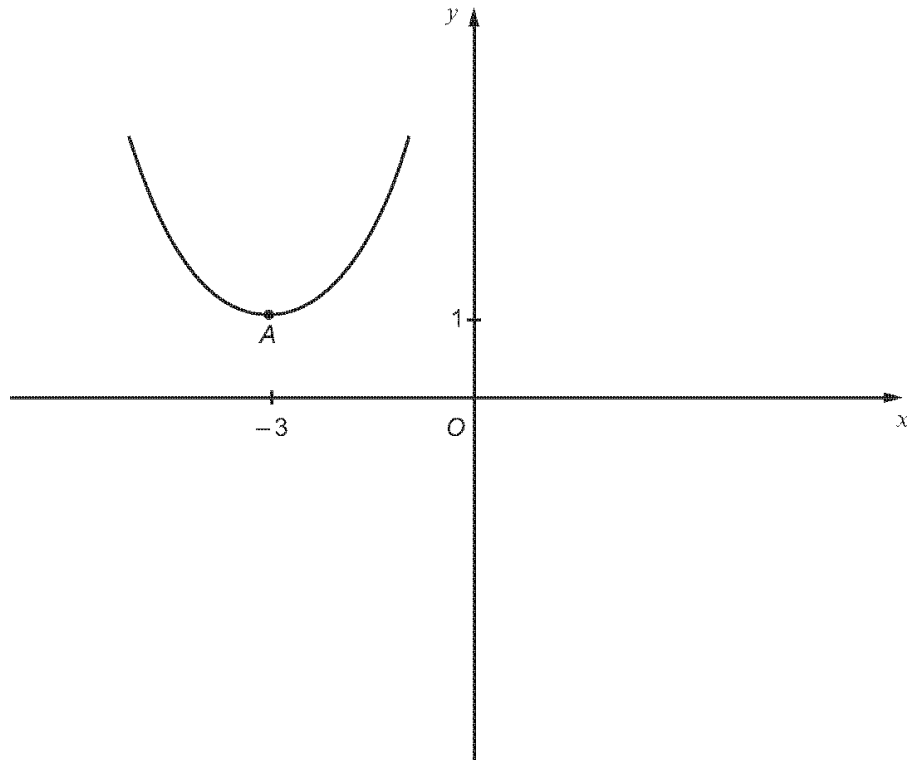
3. (a) The graph shows a sketch of the curve with equation $y = f(x)$.
The lowest point of the curve is labelled A and has coordinates $(-3, 1)$.



On the same axes, sketch the graph of the curve with equation $y = -f(x)$.
Indicate clearly the coordinates of one point on this curve.

[2]

- (b) This graph again shows a sketch of the curve with equation $y = f(x)$.
The lowest point of the curve is labelled A and has coordinates $(-3, 1)$.



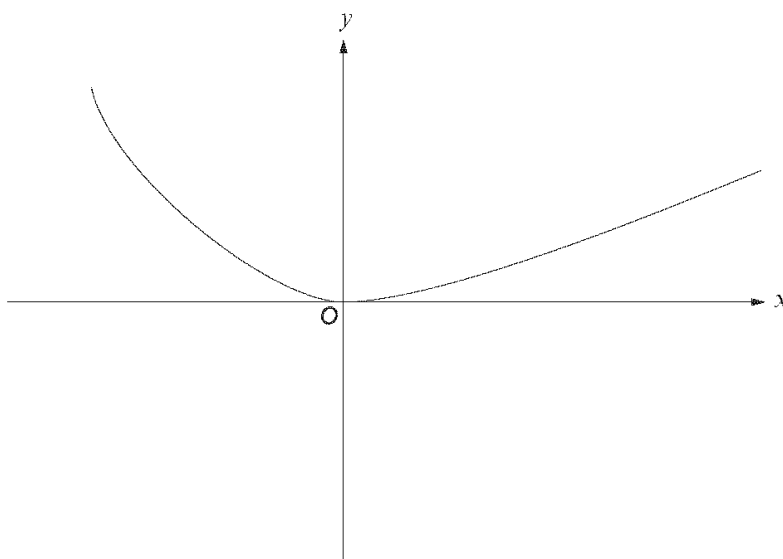
On the same axes, sketch the graph of the curve with equation $y = f(x - 5)$.
Indicate clearly the coordinates of one point on this curve.

[2]

4.

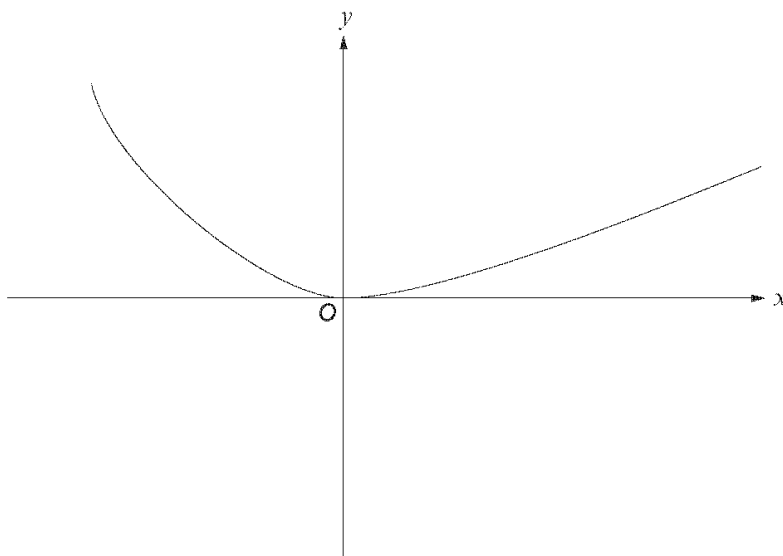
- (a) The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x - 4)$.
Mark clearly the coordinates of the point where this curve touches an axis.

[2]



- (b) The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = -f(x) + 2$.
Mark clearly the coordinates of the point where this curve meets the y -axis.

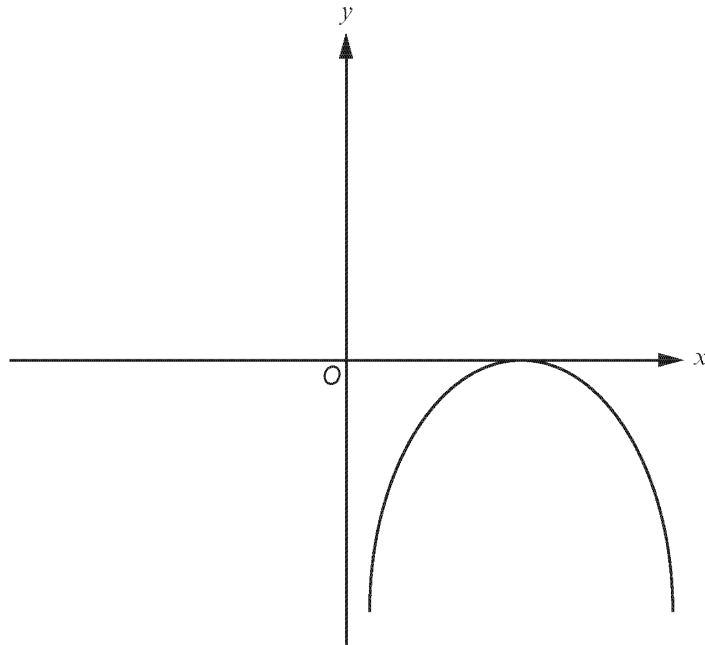
[3]



5.

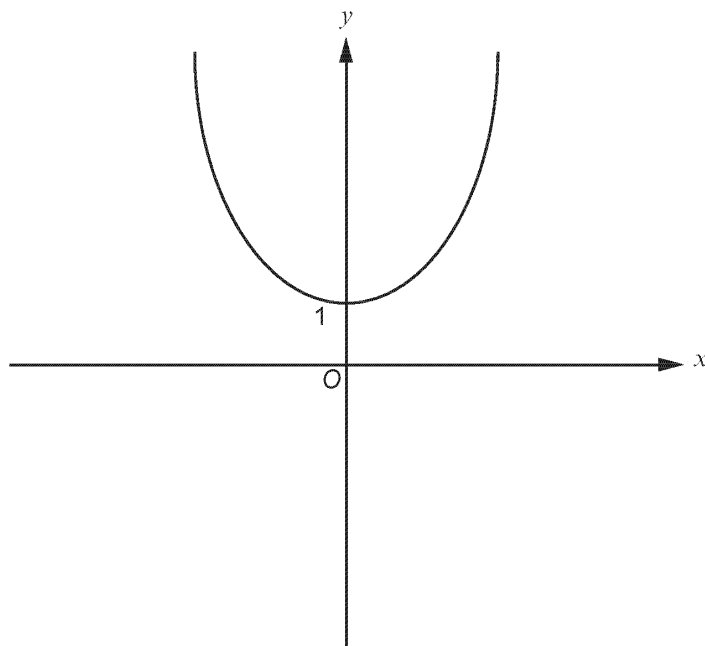
- (a) This diagram shows a sketch of the curve $y = f(x)$.
On the same diagram, sketch the curve $y = -f(x)$.

[1]



- (b) This diagram shows a sketch of the curve $y = g(x)$.
On the same diagram, sketch the curve $y = g(2x)$.

[1]

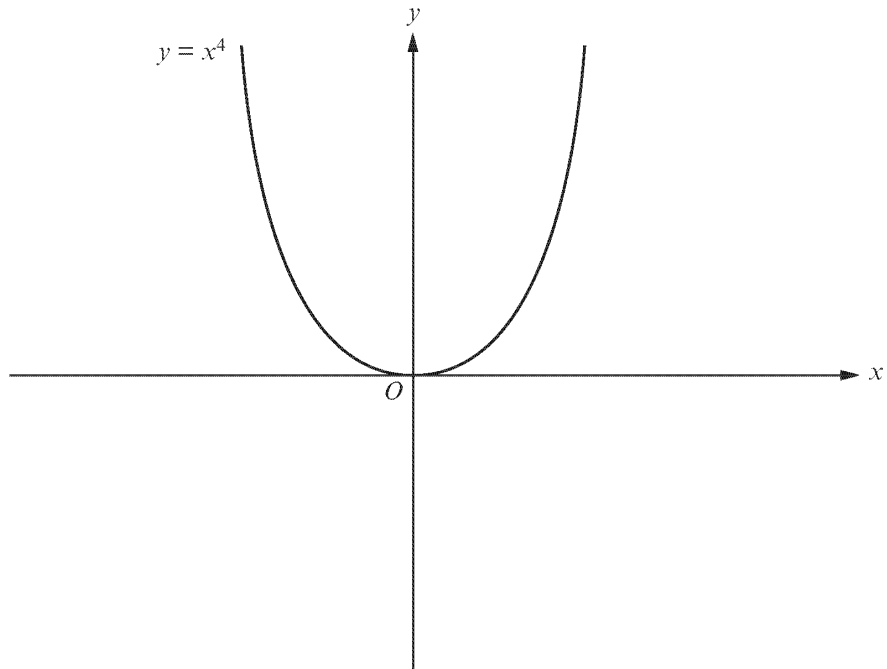


6.

The diagram shows a sketch of $y = x^4$.

On the same diagram, sketch the curves $y = -x^4$ and $y = -x^4 - 3$.

Clearly label each graph with its equation, and indicate the coordinates of any point where a curve crosses an axis. [3]



Marking Scheme

1.

Unit 2 GCSE Maths June 2015 Higher Tier	T I C K	M A R K	Comment
15. (a) Sketch with downwards shift - 4 indicated on y-axis or (0, -4) given		B1 B1	Clear intention to draw same curve. Depends on correct shape of first curve.
(b) Reflection in x axis - 1 indicated on y-axis or (0, -1) given		B1 B1	Clear intention to reflect same curve. Depends on first B1.

2.

Sketch of inverted curve	B1	Clear intention to draw the same curve reflected in the x-axis.
Passing through (0, -2) [-2 indicated on y-axis or (0, -2) given] AND passing through (3, 0)	B1	Depends on first B1.
	2	

3.

Unit 2 GCSE Maths November 2015 HigherTier	M A R K	FINAL MARK SCHEME Comment
15. (a) Reflection in the x axis. Co-ordinates (-3, -1) clearly indicated.	B1 B1	Depends on 1 st B1.
(b) Horizontal translation to the right. (2, 1) indicated correctly with the correct translation.	B1 B1	SC1 for left shift with (-8, 1) indicated. Depends on 1 st B1.
	4	

4.

Methods in Mathematics June 2015 Unit 1 Higher Tier	Mark	Comment
19.(a) Transformation horizontally to the right	B1	SC1 for left shift with -4 indicated on the x-axis
Correct translation with (4,0) or 4 indicated correctly on the x-axis	B1	
(b) Idea of reflection in x-axis	B1	May include an incorrect translation, but clearly there has been a reflection
Idea of vertical translation	B1	Allow 'up' or 'down'
Correct transformation with (0,2) or 2 indicated on the y-axis	B1	
	5	

5.
6.

16. Inverted curve (no vertical or horizontal stretch) with vertex at the origin	B1	Clear intention
Vertical translation down	B1	FT their curve
Point (0, -3) indicated in relation to 2 nd curve.	B1	Accept -3 indicated on y-axis
	3	

Examiner's Comments

1. This was well answered by many candidates. A good number knew to translate the curve downwards for part (a), and then to reflect in the x-axis for part (b). However, some candidates failed to note the requirement to indicate the coordinates of the y-intercept in each case.

This comment originally referred to question 15 on paper 4352/02 (04/06/2015)

2. Very few correctly transformed curves were seen.

This comment originally referred to question 17 on paper 4352/02 (11/01/2017)

3. This was well answered by many candidates. A good number knew to reflect the curve in the x axis for part (a), and then to translate horizontally for part (b). However, some candidates failed to note the requirement to indicate the coordinates of an appropriate point in each case.

This comment originally referred to question 15 on paper 4352/02 (06/11/2015)

4. Many candidates had insecure knowledge of transformations, this was evident from part (a), with all types of shifts, up/down/left or right shown.

In part (b) a number of candidates showed the reflection.

This comment originally referred to question 19 on paper 4363/02 (21/05/2015)

5. This was variable. A good number of candidates knew to reflect the curve in the axis for part (a), but very few were successful in part (b), too often sketching the graph of

$y = 2g(x)$ or $y = g(x) + 2$ rather than the required $y = g(2x)$.

This comment originally referred to question 15 on paper 4352/02 (01/02/2016)

6. Many candidates were awarded full marks for this question. However, some did not understand the effect of the minus sign. For the second curve, some candidates shifted to the left or right instead of downwards

This comment originally referred to question 16 on paper 4352/02 (01/03/2015)