1.7 Transformations of Functions

Question Paper

Course	Edexcel IAL Maths: Pure 1
Section	1. Algebra & Functions
Topic	1.7 Transformations of Functions
Difficulty	Easy

Time allowed: **30**

Score: **/27**

Percentage: **/100**

Question 1

A curve has equation $y = \mathrm{f}(x)$.
Describe the transformation of the curve given by the equations below:

(i) $y = \mathrm{f}(x) + 2$,
(ii) $y = \mathrm{f}(x - 2)$,
(iii) $y = 3\mathrm{f}(x)$,
(iv) $y = \mathrm{f}(2x)$.

[4 marks]

Question 2

A curve has equation $y = \mathrm{f}(x)$.
Write down the equations of the curves, in terms of $\mathrm{f}(x)$, given by the following transformations:

(i) Translation by the vector $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$,
(ii) Horizontal stretch, scale factor 2,
(iii) Vertical stretch, scale factor $\frac{1}{3}$,
(iv) Reflection in the y-axis.

[4 marks]

Question 3

The point $P(2\,,6)$ lies on the curve with equation $y = \mathrm{f}(x)$.
State the coordinates of the image of point P on the curves with the following equations:

(i) $y = \mathrm{f}(x) + 1$,
(ii) $y = -\mathrm{f}(x)$,
(iii) $y = \mathrm{f}(\frac{1}{4}x)$.

[3 marks]

Question 4

A point $P\ (-2\ ,8)$, on the graph of $y = \mathrm{f}(x)$, is mapped to the point P' under a single transformation.
For the following coordinates of P' write down what the transformation could have been:

(i) $P'(-2\ ,3)$,
(ii) $P'(-4\ ,8)$,
(iii) $P'(-2\ ,-8)$.

[3 marks]

Question 5

Point P has coordinates $(3\ ,-4)$ and lies on the curve with equation $y = \mathrm{f}(x)$.
Write down the value of a given that:

(i) On the graph of $y = \mathrm{f}(x + a)$, point P is mapped to point $P'(-3\ ,-4)$,
(ii) On the graph of $y = a\mathrm{f}(x)$, point P is mapped to point $P'(3\ ,-12)$,
(iii) On the graph of $y = \mathrm{f}(ax)$, point P is mapped to point $P'(-3\ ,-4)$.

[3 marks]

Question 6

The function $f(x)$ is defined as $f(x) = (x - 2)(x - 6)$

(a) Sketch the graph of $y = f(x)$, showing clearly the coordinates of the points where the graph intersects the coordinate axes and the coordinates of the turning point.

[3 marks]

Question 6

(b) On separate diagrams sketch the graphs of:

(i) $y = f(x - 4)$,

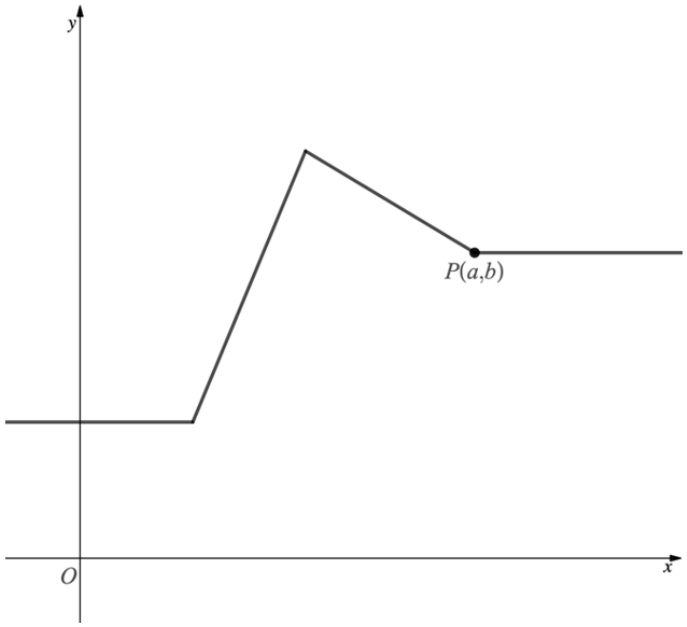
(ii) $y = f(-x)$.

In each case clearly show the coordinates of the points where the graph intersects the coordinate axes and the coordinates of the turning point.

[4 marks]

Question 7

The diagram below shows the graph of $y = \mathrm{f}(x)$.
The point P has coordinates $(a\ , b)$, where $a, b > 0$.



In terms of a and b write down the coordinates of the image of point P under the following graph transformations:

(i) $y = \mathrm{f}(2x)$,
(ii) $y = -\mathrm{f}(x)$,
(iii) $y = a\mathrm{f}(x)$.

[3 marks]