


Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
TOTAL	

GCSE Mathematics (Non-calculator Paper)

Practice Paper Style Questions
Topic: Transformation of Functions (Higher Tier)

<p>For this paper you must have:</p> <ul style="list-style-type: none"> • black pen • HB pencil • ruler (with cm & mm) • rubber • protractor • compass • pencil sharpener 	
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Time allowed

- 1 hour

Instructions

- Use **black ink** or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the space provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is **26**.
The quality of your written communication is specifically assessed in questions indicated with an asterisk (*)
- You may ask for more answer paper and graph paper.
These must be tagged securely to this answer booklet.
- A calculator must NOT be used.

Advice

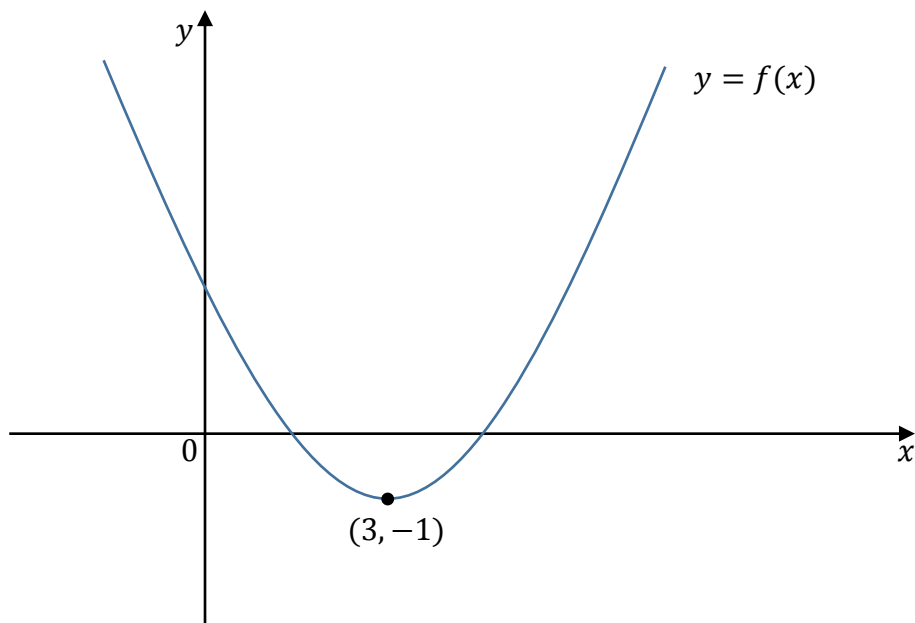
- Read each question carefully before you answer it.
- In all calculations, show clearly how you work out your answer.
- Check your answers if you have time at the end.

There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

- 1 The diagram shows part of the curve with the equation $y = f(x)$

The co-ordinates of the minimum point of the curve are $(3, -1)$



- (a) Write down the coordinates of the minimum point of the curve with the equation:

(i) $y = f(x - 3)$ Answer (1 mark)

(ii) $y = 2f(x)$ Answer (1 mark)

(iii) $y = f(3x)$ Answer (1 mark)

The curve of $y = f(x)$ is reflected in the y axis.

- (b) Find the equation of the curve following this transformation.

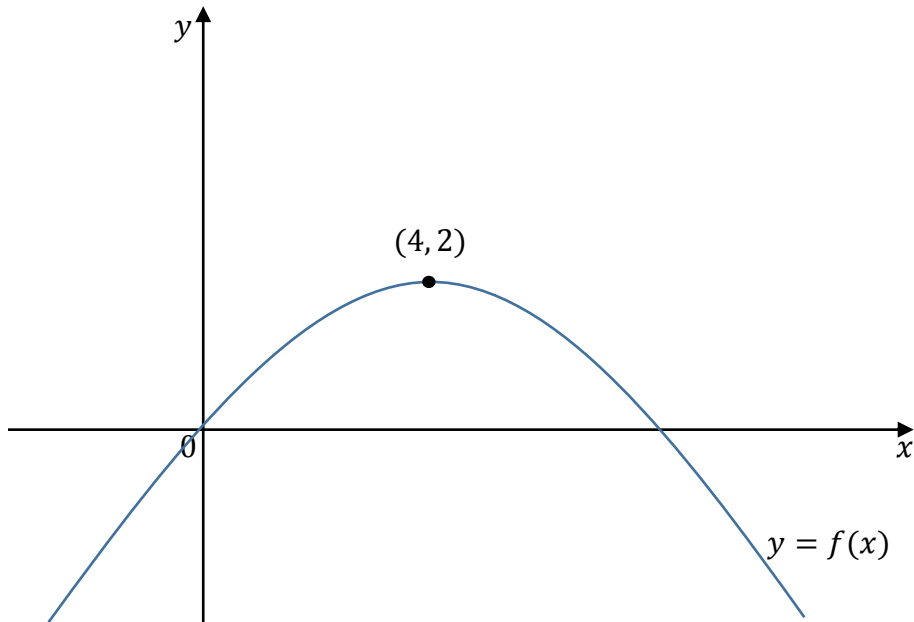
Answer $y =$ (1 mark)

The curve with the equation $y = f(x)$ has been transformed to give the curve with the equation $y = f(x) + 3$

- (c) Describe this transformation.

Answer (1 mark)

2



The diagram shows part of the curve with the equation $y = f(x)$

The co-ordinates of the maximum point of the curve are $(4, 2)$

Write down the coordinates of the maximum point of the curve with the equation:

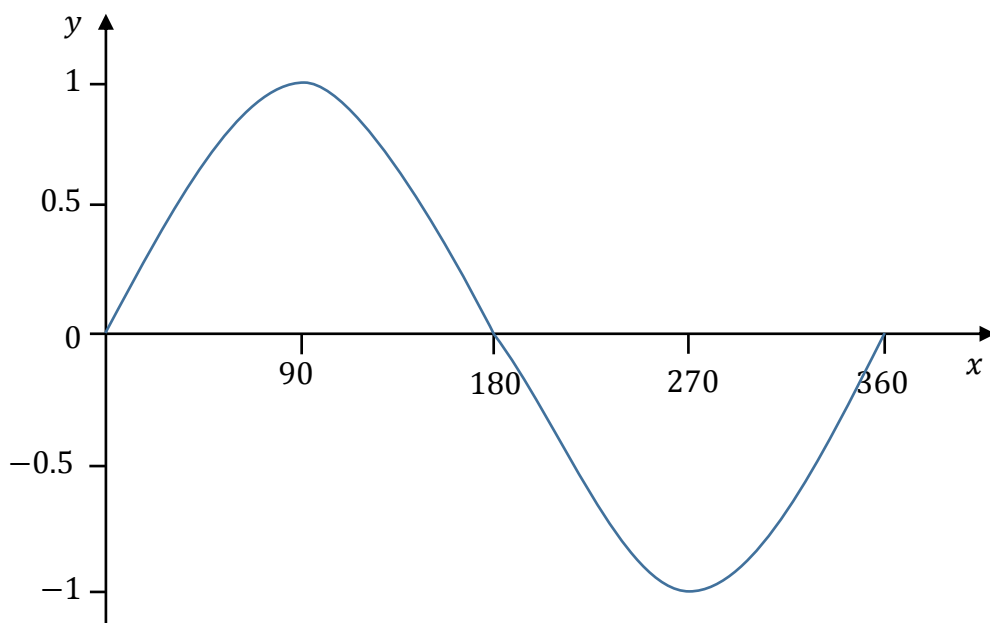
(a) $y = f(x - 2)$

Answer (1 mark)

(b) $y = 3f(x)$

Answer (1 mark)

- 3 The diagram shows a sketch of the curve $y = \sin x^\circ$ for $0 \leq x \leq 360$



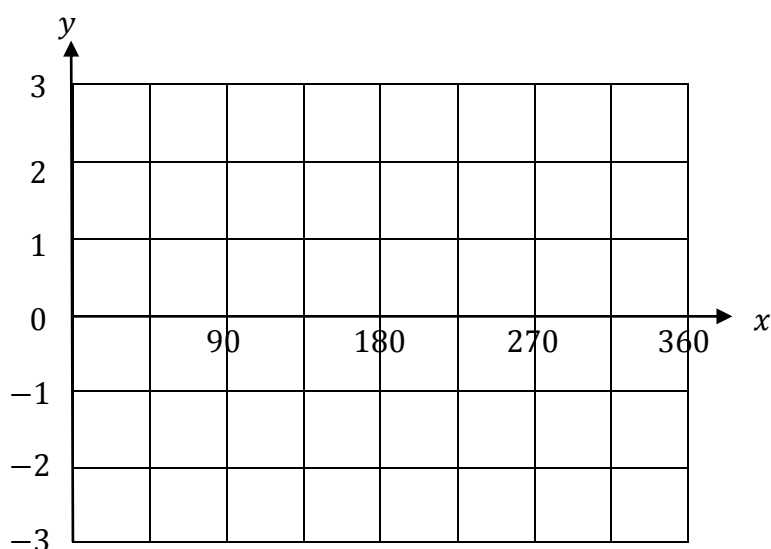
The exact value of $\sin 60^\circ = \frac{\sqrt{3}}{2}$

- (a) Write down the coordinates of the minimum point of the curve with the equation:

(i) $\sin 240^\circ$ Answer (1 mark)

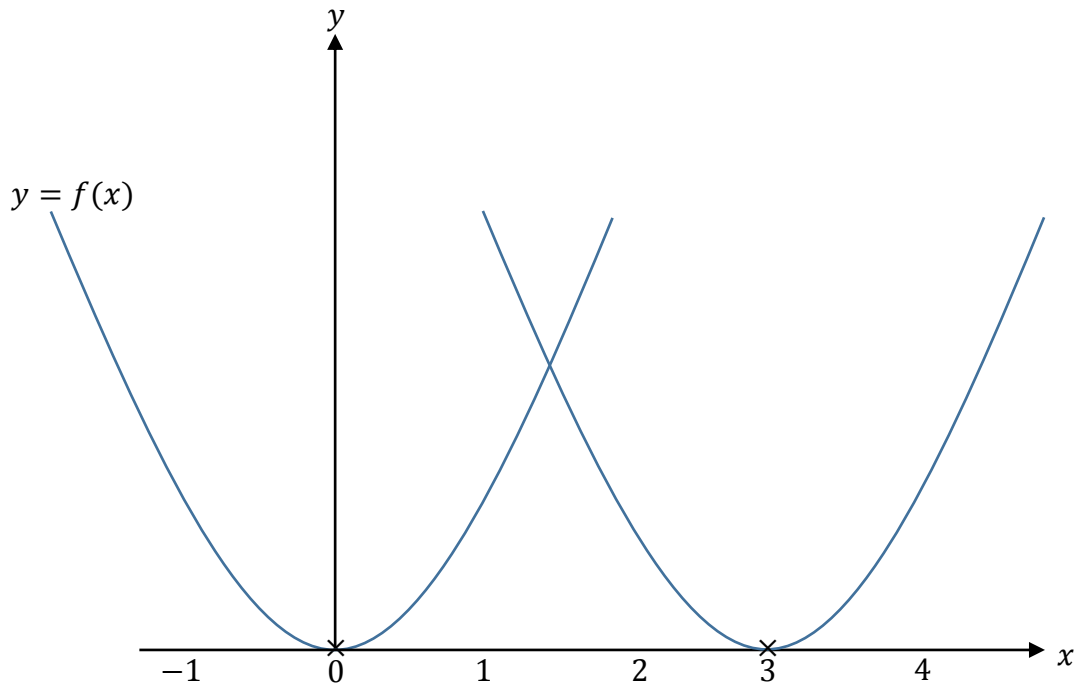
(ii) $\sin 300^\circ$ Answer (1 mark)

- (b) On the grid below, sketch the graph of $y = 3 \sin 2x^\circ$ for $0 \leq x \leq 360$



(2 marks)

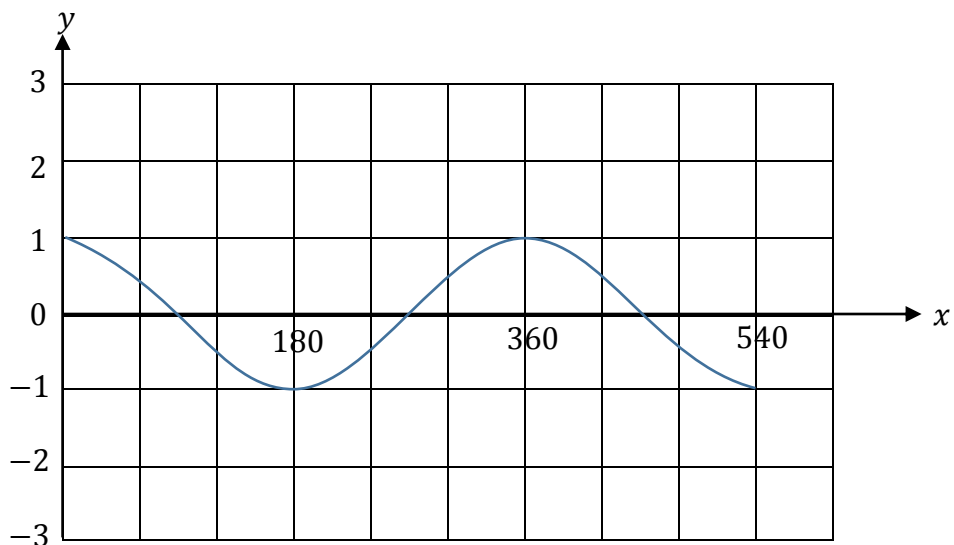
- 4 The curve with the equation $y = f(x)$ is translated so that the point $(0, 0)$ is mapped onto the point $(3, 0)$



- (a) Find the equation of the translated curve.

Answer (2 marks)

The grid below shows the graph of $y = \cos x^\circ$ for values of x from 0 to 540

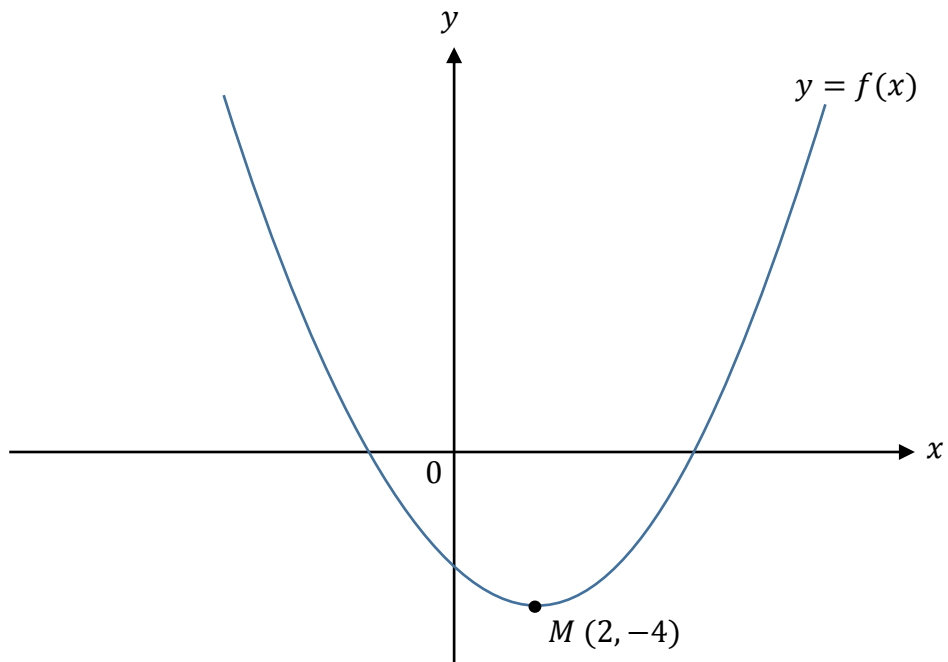


- (b) On the grid, sketch the graph of $y = 2 \cos(2x^\circ)$ for values of x from 0 to 540.

(2 marks)

- 5 The diagram shows part of the curve with the equation $y = f(x)$

The co-ordinates of the minimum point, M , of the curve are $(2, -4)$



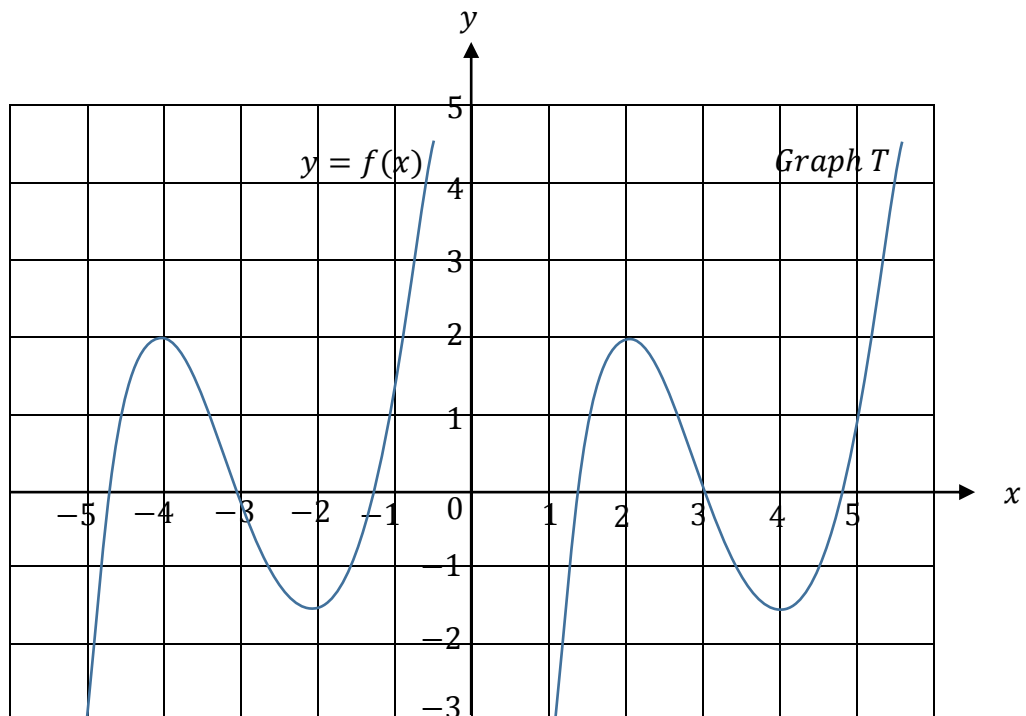
- (a) Write down the coordinates of the minimum point of the curve with the equation $y = f(x - 3)$

Answer (2 marks)

- (b) Write down the coordinates of the minimum point of the curve with the equation $y = f(x + 3) + 4$

Answer (2 marks)

- 6 The graph of $y = f(x)$ is shown on the grid:



The Graph T is a translation of the graph $y = f(x)$

- (a) Write down the equation of Graph T in terms of f

Answer (1 mark)

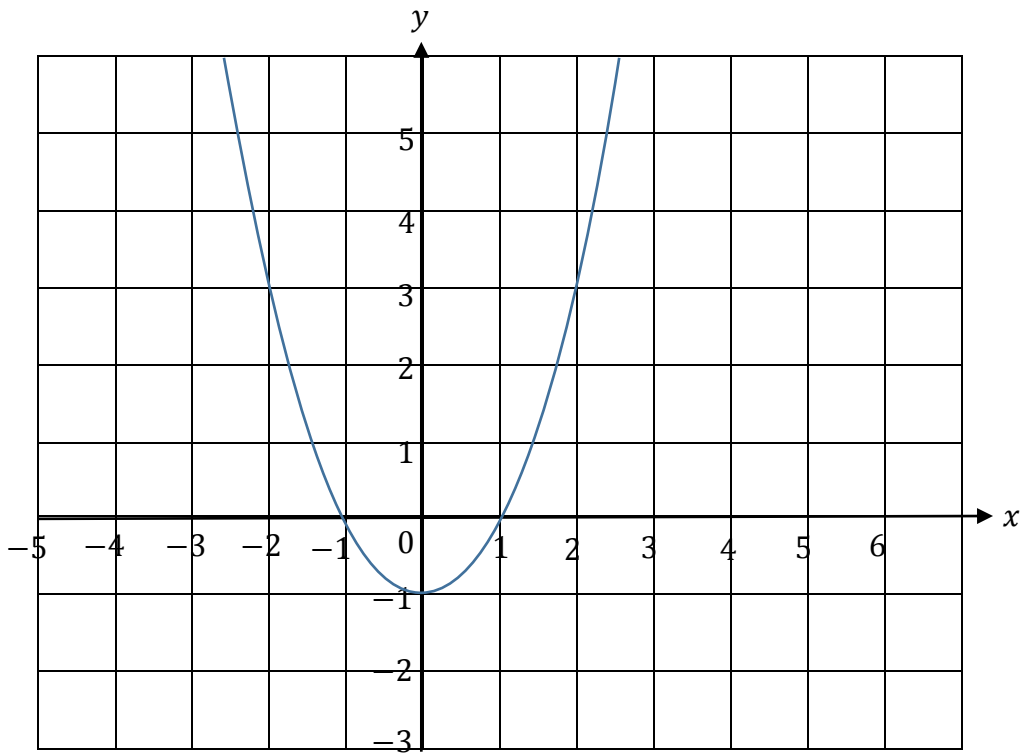
The graph of $y = f(x)$ has a maximum point at $(-4, 2)$.

- (b) Write down the coordinates of the maximum point of the graph of $y = f(-2x)$

Answer (2 marks)

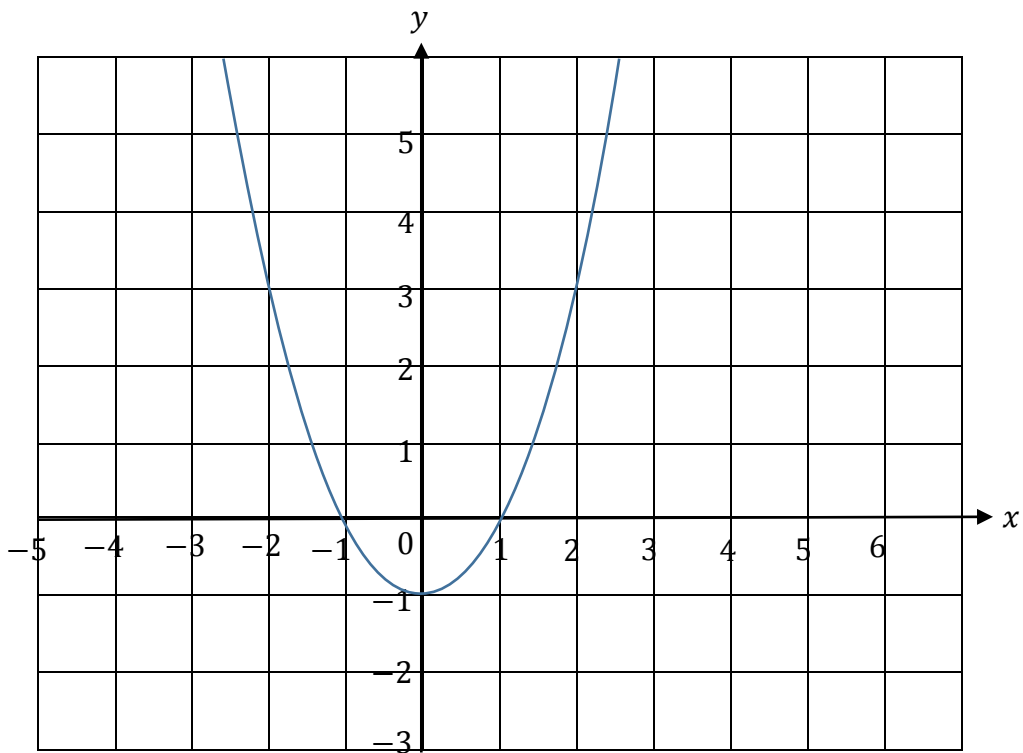
7 The graph of $y = f(x)$ is shown on each of the following two grids.

(a) On this grid, sketch the graph of $y = f(x - 3)$



(2 marks)

(b) On this grid, sketch the graph of $y = 2f(x)$



(2 marks)

END OF QUESTIONS

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