

## 1MA1 Higher themed papers: Transformations: Trig graphs

Write your name here			
Surname	Other names		
Centre Number		Candidate Number	
Pearson Edexcel Level 1/Level 2 GCSE (9–1)			
<b>Mathematics</b>			
<b>Transformations: Trig graphs</b>			
			Paper Reference <b>1MA1</b>
<b>You must have:</b> Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.			Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- If your calculator does not have a  $\pi$  button, take the value of  $\pi$  to be 3.142 unless the question instructs otherwise.

### Information

- The total mark for this paper is **30**. There are **11** questions.
- Questions have been arranged in an ascending order of mean difficulty, as found by all students in the June 2017–November 2019 examinations.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

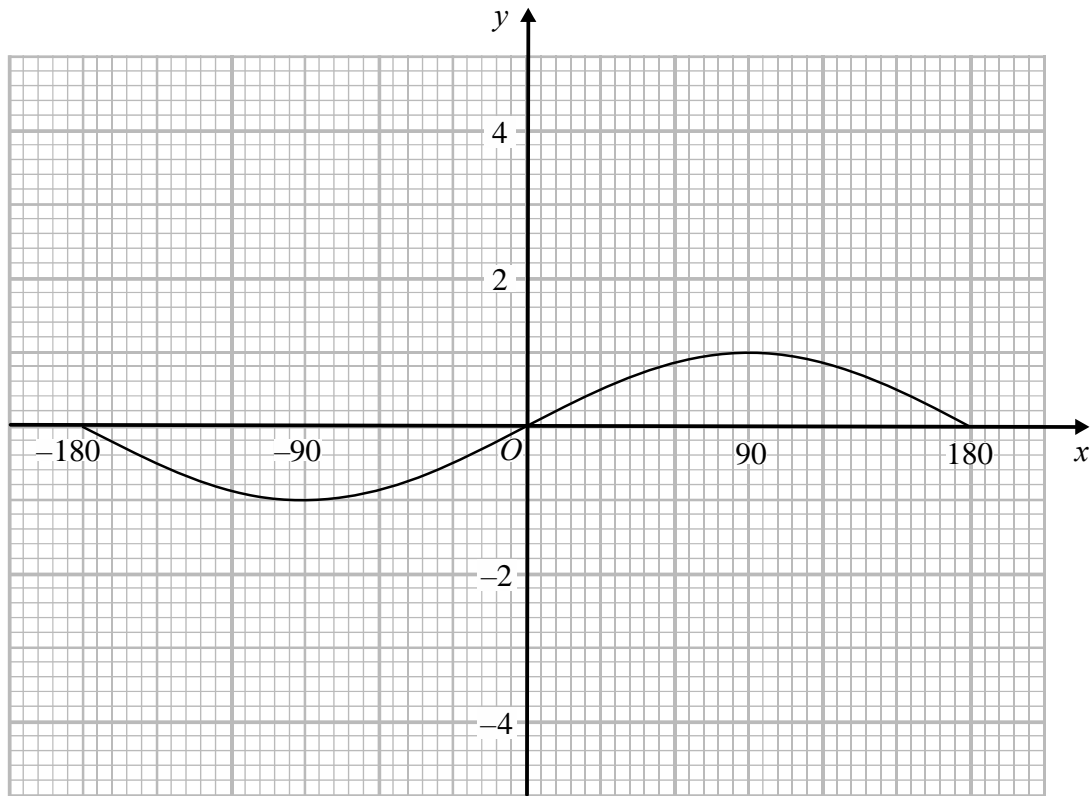
### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

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**1** Here is the graph of  $y = \sin x^\circ$  for  $-180 \leq x \leq 180$



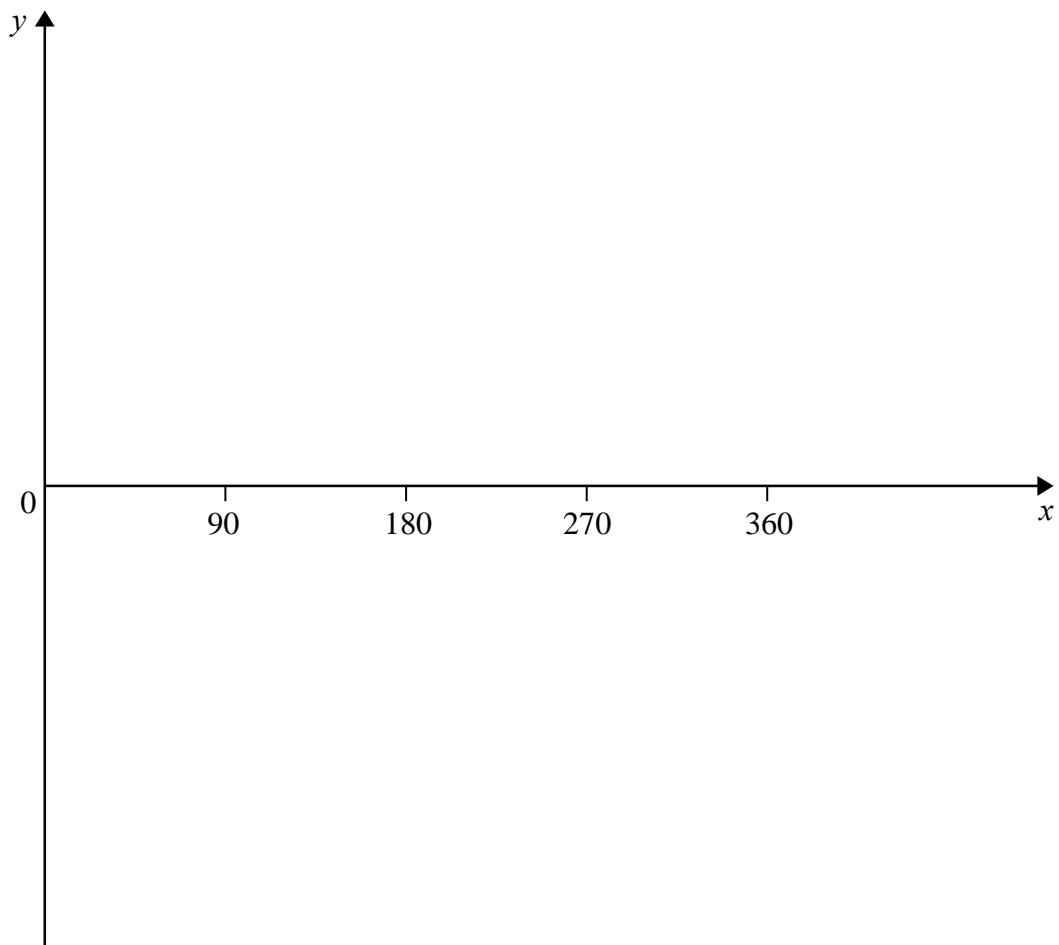
On the grid, sketch the graph of  $y = \sin x^\circ - 2$  for  $-180 \leq x \leq 180$

**(Total for Question 1 is 2 marks)**

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- 2 Sketch the graph of  $y = \tan x^\circ$  for  $0 \leq x \leq 360$



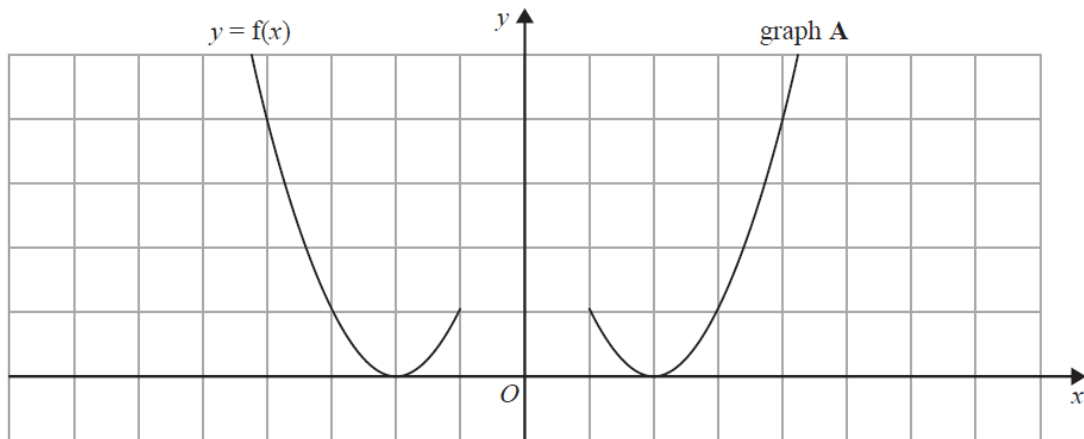
**(Total for Question 2 is 2 marks)**

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**3** The graph of  $y = f(x)$  is shown on the grid.

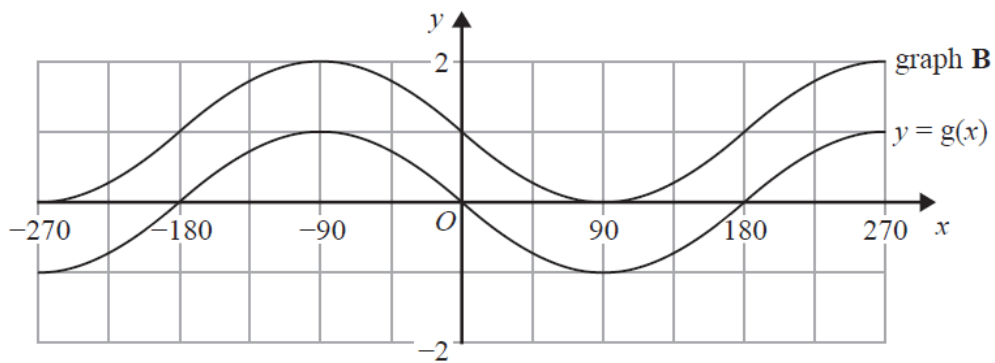


Graph **A** is a reflection of the graph of  $y = f(x)$ .

(a) Write down the equation of graph **A**.

.....  
(1)

The graph of  $y = g(x)$  is shown on the grid.



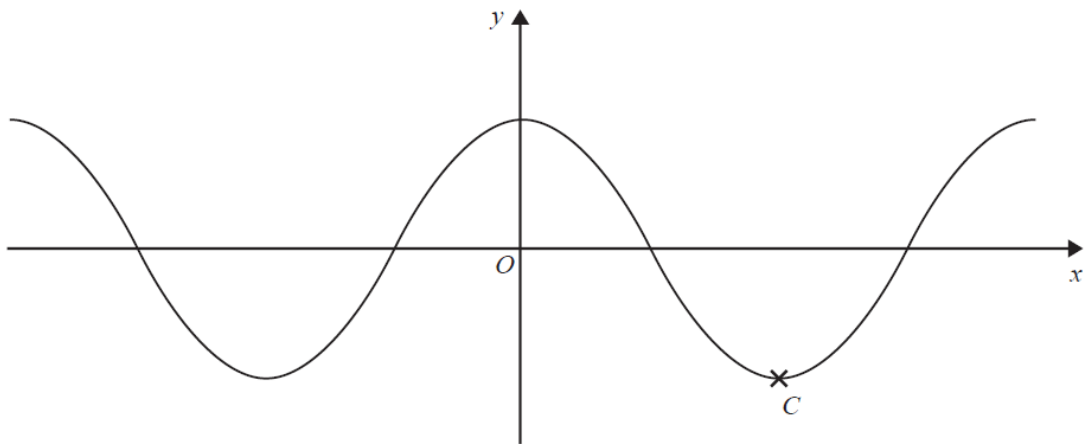
Graph **B** is a translation of  $y = g(x)$ .

(b) Write down the equation of graph **B**.

.....  
(1)

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The graph of  $y = \cos x^\circ$  is shown.



(c) Write down the coordinates of the point marked  $C$ .

(....., .....) )

**(1)**

**(Total for Question 3 is 3 marks)**

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**4** The equation of a curve is  $y = a^x$   
A is the point where the curve intersects the y-axis.

(a) State the coordinates of A.

( ..... , ..... )  
**(1)**

The equation of circle **C** is  $x^2 + y^2 = 16$

The circle **C** is translated by the vector  $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$  to give circle **B**.

(b) Draw a sketch of circle **B**.

Label with coordinates  
the centre of circle **B**  
and any points of intersection with the  $x$ -axis.

**(3)**

**(Total for Question 4 is 4 marks)**

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**5** The graph of the curve C with equation  $y = f(x)$  is transformed to give the graph of the curve S with equation  $y = f(-x) - 3$

The point on C with coordinates  $(7, 2)$  is mapped to the point  $Q$  on S.

Find the coordinates of  $Q$ .

(..... , .....)

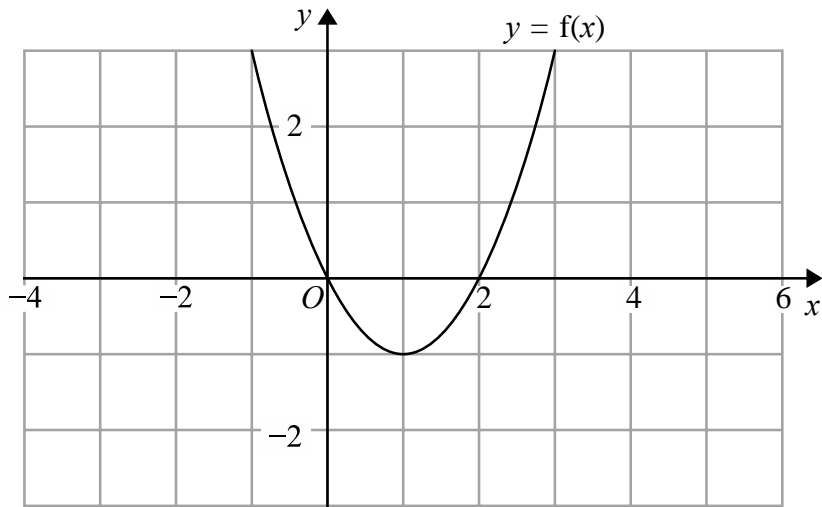
**(Total for Question 5 is 2 marks)**

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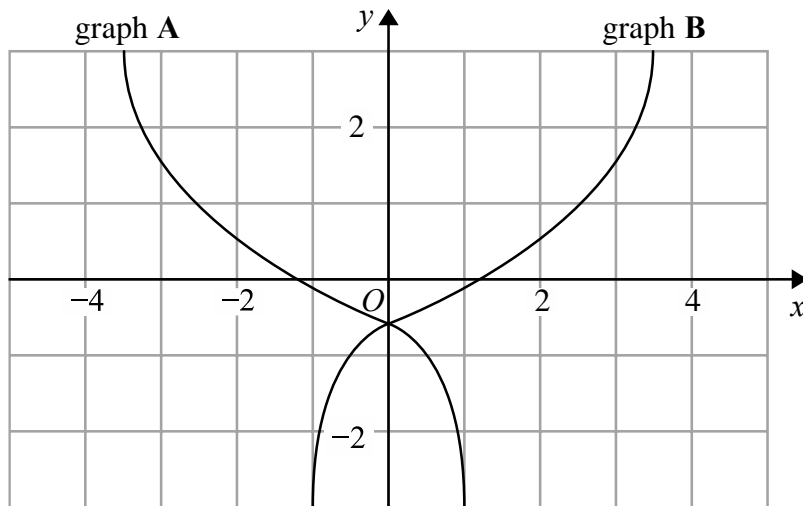


**6** The graph of  $y = f(x)$  is shown on the grid below.



(a) On the grid above, sketch the graph of  $y = f(x - 2)$

**(1)**



On the grid, graph **A** has been reflected to give graph **B**.

The equation of graph **A** is  $y = g(x)$

(b) Write down the equation of graph **B**.

.....  
**(1)**

**(Total for Question 6 is 2 marks)**

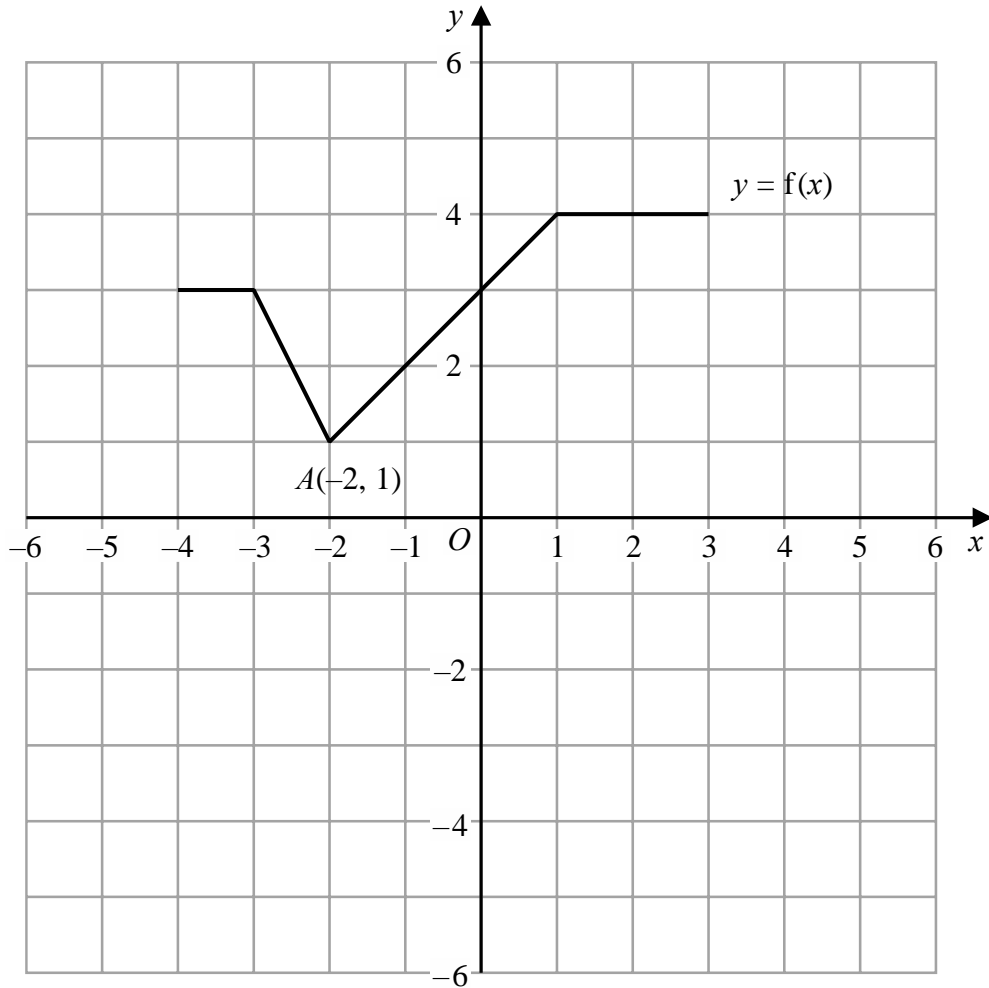


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7

The graph of  $y = f(x)$  is shown on the grid.



(a) On the grid, draw the graph with equation  $y = f(x + 1) - 3$

(2)

Point  $A(-2, 1)$  lies on the graph of  $y = f(x)$ .

When the graph of  $y = f(x)$  is transformed to the graph with equation  $y = f(-x)$ , point  $A$  is mapped to point  $B$ .

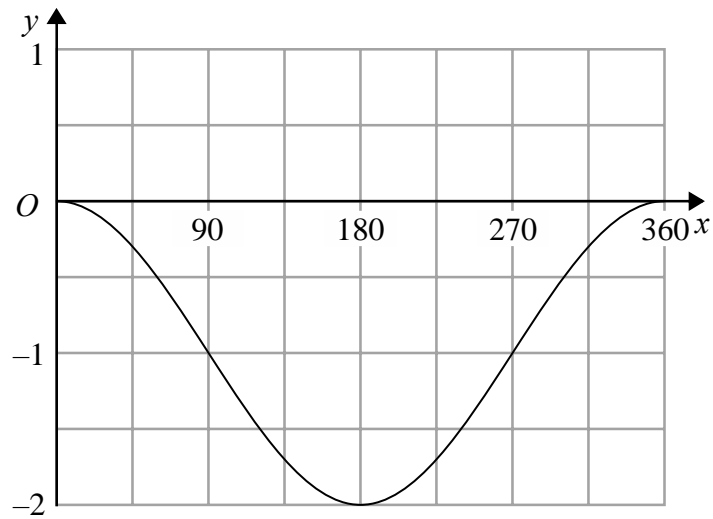
(b) Write down the coordinates of point  $B$ .

(....., .....)  
(1)

**(Total for Question 7 is 3 marks)**

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**8** Here is a sketch of the curve  $y = \sin(x + a)^\circ + b$



Given that  $0 < a < 360$   
find the value of  $a$  and the value of  $b$ .

$a = \dots\dots\dots$

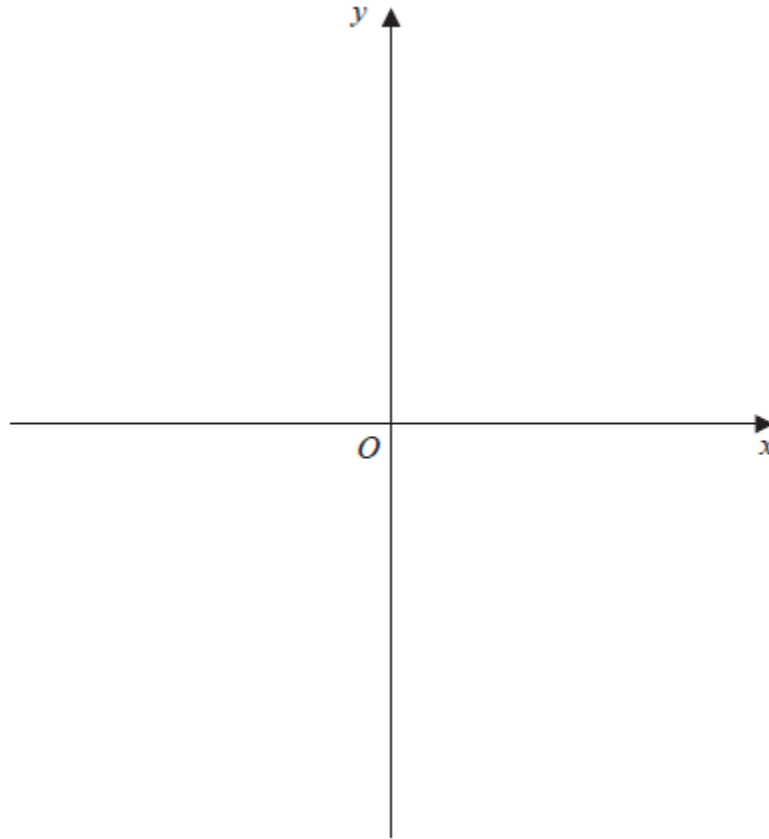
$b = \dots\dots\dots$

**(Total for Question 8 is 2 marks)**

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**9** The graph of  $y = x^2$  is reflected in the line with equation  $y = x$  to give the curve **C**.

(a) Sketch the graph of  $y = x^2$  and the curve **C**.  
Clearly label the graphs.

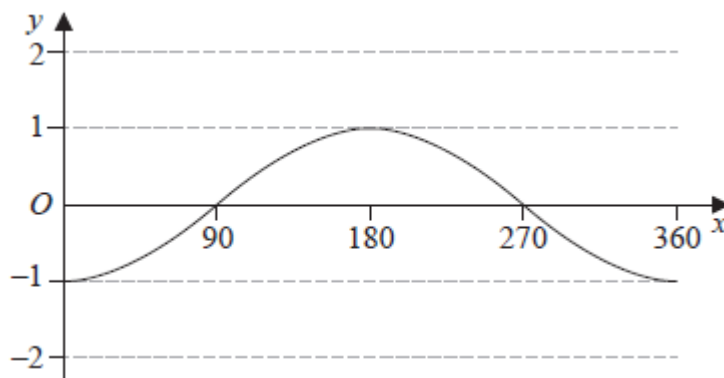


**(Total for Question 9 is 3 marks)**

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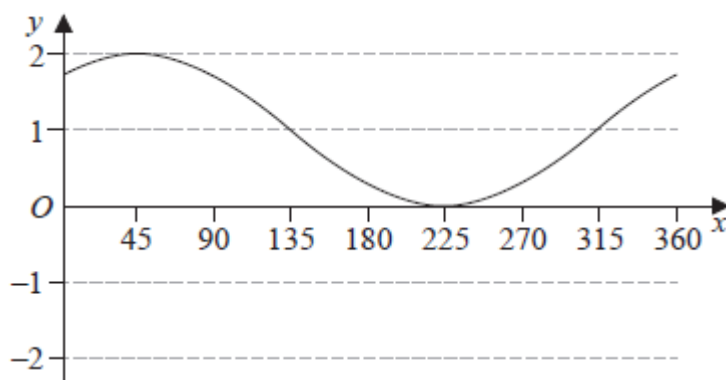
**10** Here is a sketch of the graph of a trigonometric function for  $0 \leq x \leq 360$



(a) Write down a possible equation of the graph.

.....  
(1)

Here is a sketch of the graph of  $y = \cos(x - p)^\circ + r$  for  $0 \leq x \leq 360$



(b) Find the value of  $p$  and the value of  $r$ .

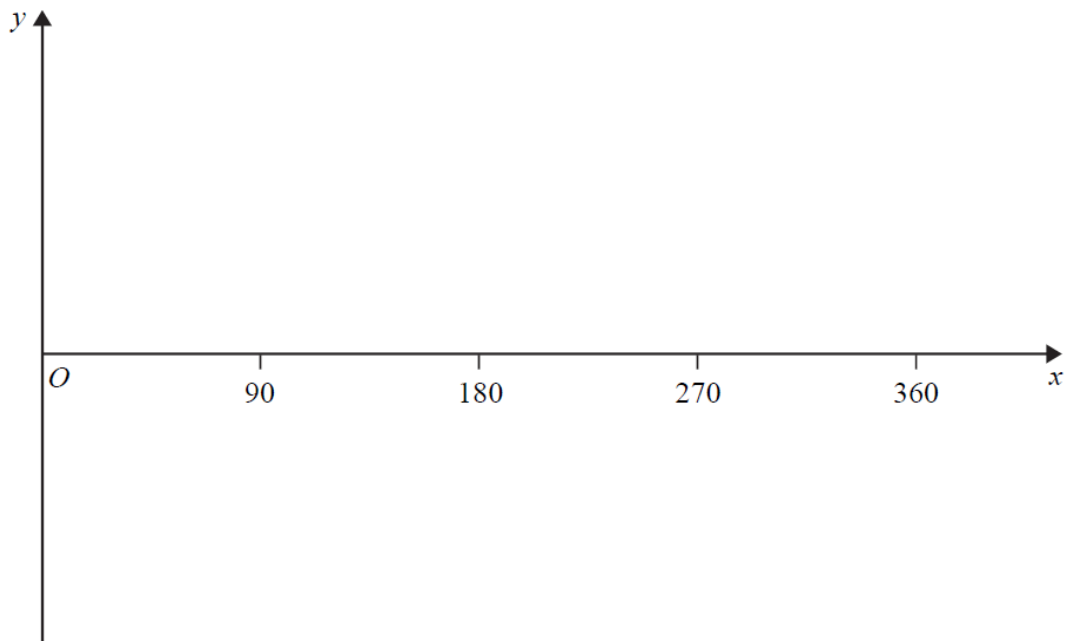
$p =$  .....

$r =$  .....  
(2)

**(Total for Question 10 is 3 marks)**

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- 11** (a) Sketch the graph of  $y = \cos x^\circ$  for  $0 \leq x \leq 360$

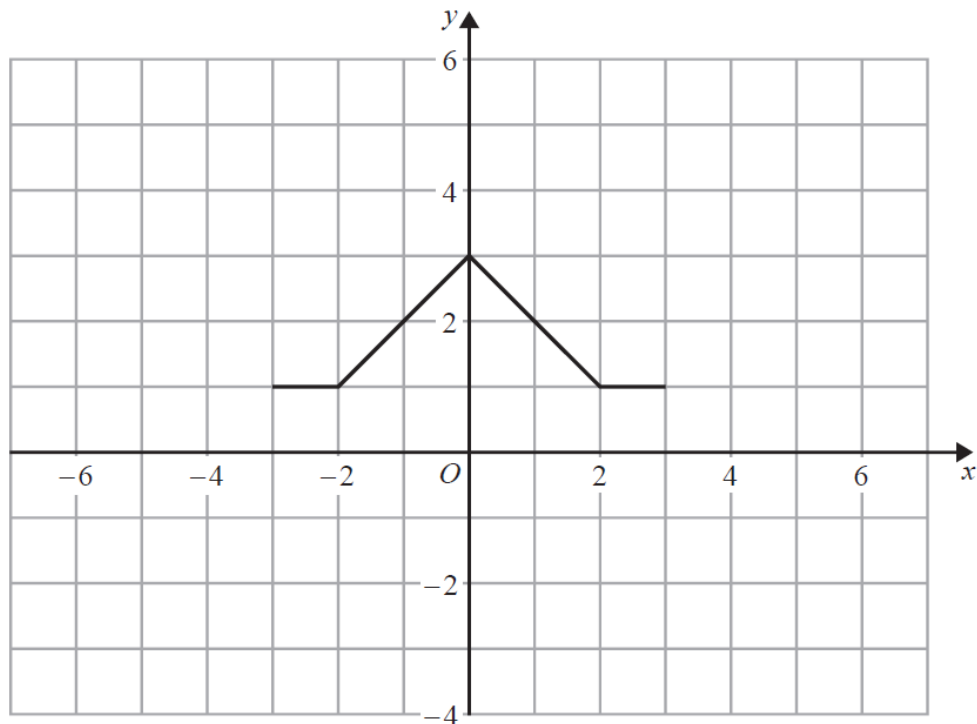


(2)

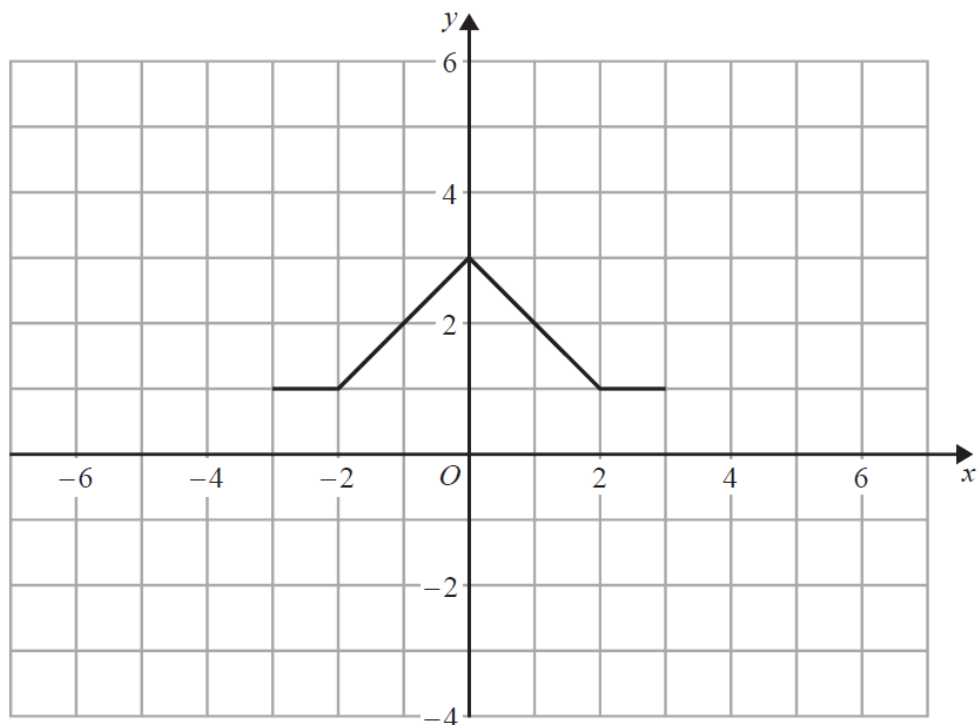
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(b) The graph of  $y = f(x)$  is shown on both grids below.

(i) On this grid, draw the graph of  $y = -f(x)$



(ii) On the grid below, draw the graph of  $y = f(x - 3)$



(2)

(Total for Question 11 is 4 marks)

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**TOTAL MARKS FOR PAPER: 30**