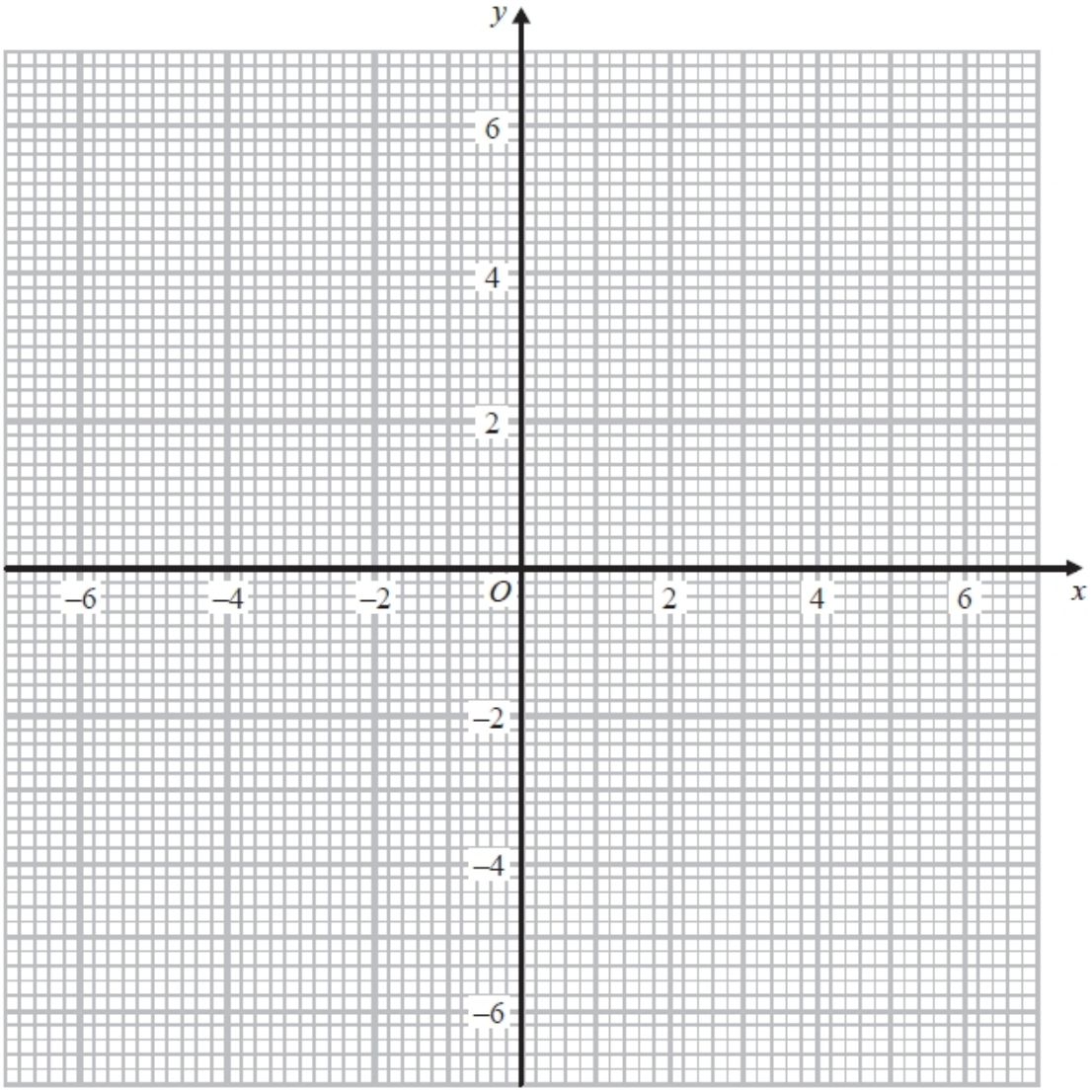
A247 Advanced graphs

Q1.

(a) On the grid, draw the graph of $x^2 + y^2 = 12.25$



(2)

(b) Hence find estimates for the solutions of the simultaneous equations

$$x^2 + y^2 = 12.25$$
$$2x + y = 1$$

.....

(3)

(Total for question = 5 marks)

Q2.

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**.

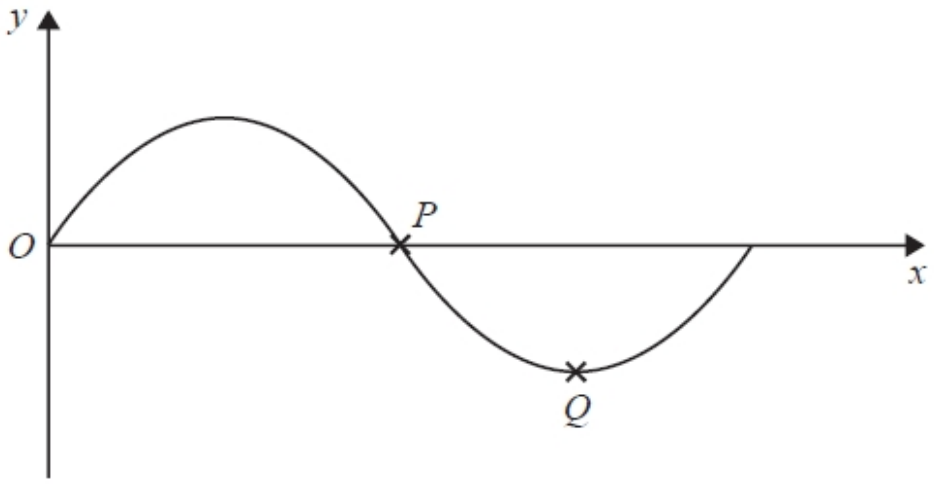
Label with coordinates
the centre of circle **B**
and any points of intersection with the x-axis.

(3)

(Total for question = 4 marks)

Q3.

The diagram shows part of a sketch of the curve $y = \sin x°$



(a) Write down the coordinates of

(i) the point P

(..... , ...)

(ii) the point Q

(..... , ...)

(2)

(b) Sketch the graph of $y = \tan x$ for $0° \leq x \leq 360°$

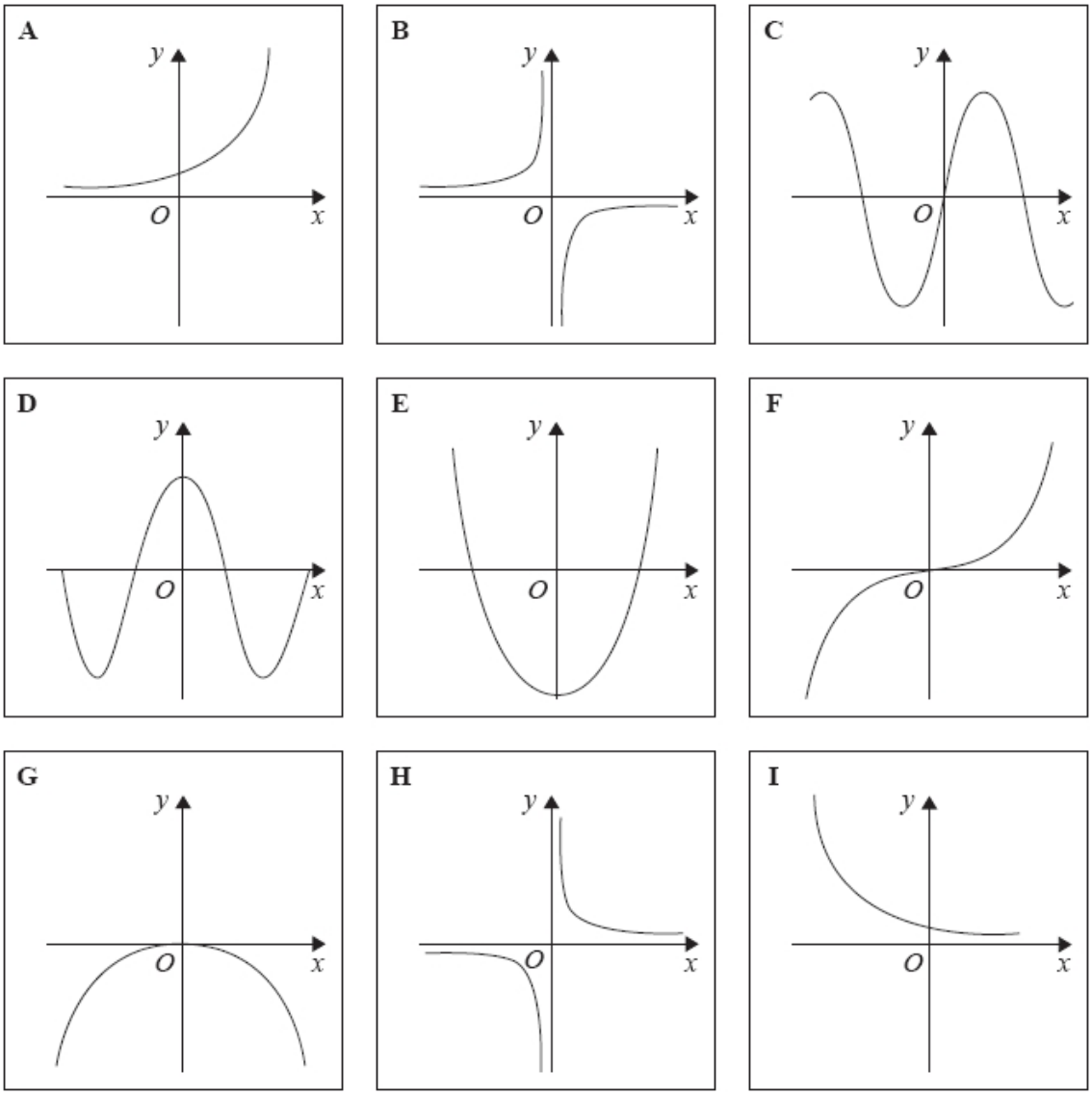
Show the coordinates of any points of intersection with the coordinate axes.

(2)

(Total for question = 4 marks)

Q4.

Here are some graphs.



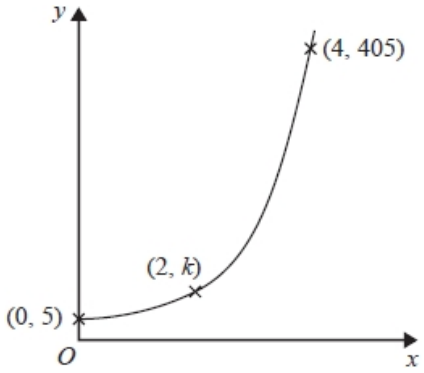
In the table below, match each equation with the letter of its graph.

Equation	Graph
$y = \sin x$	
$y = x^3 + 4x$	
$y = 2^x$	
$y = \frac{4}{x}$	

(Total for question = 3 marks)

Q5.

Here is a sketch of part of the graph of $y = pq^x$ where $q > 0$



The points (0, 5), (2, k) and (4, 405) are all on the graph of $y = pq^x$

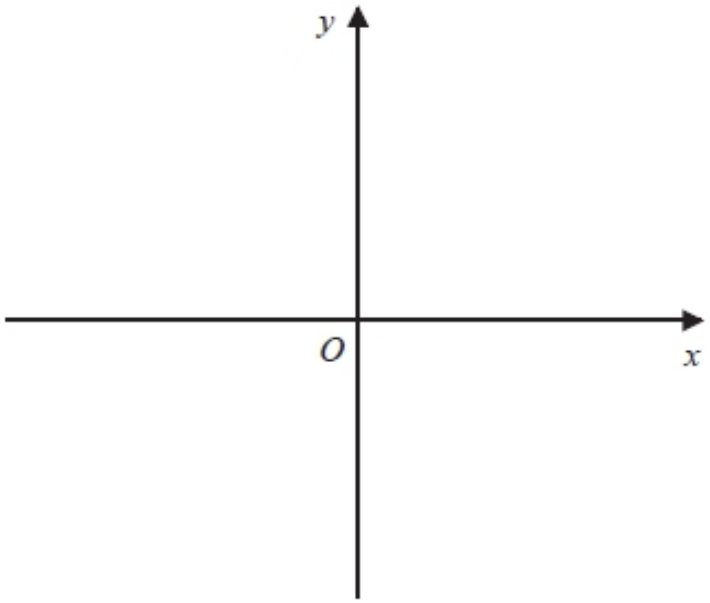
Find the value of k.

.....

(Total for question = 4 marks)

Q6.

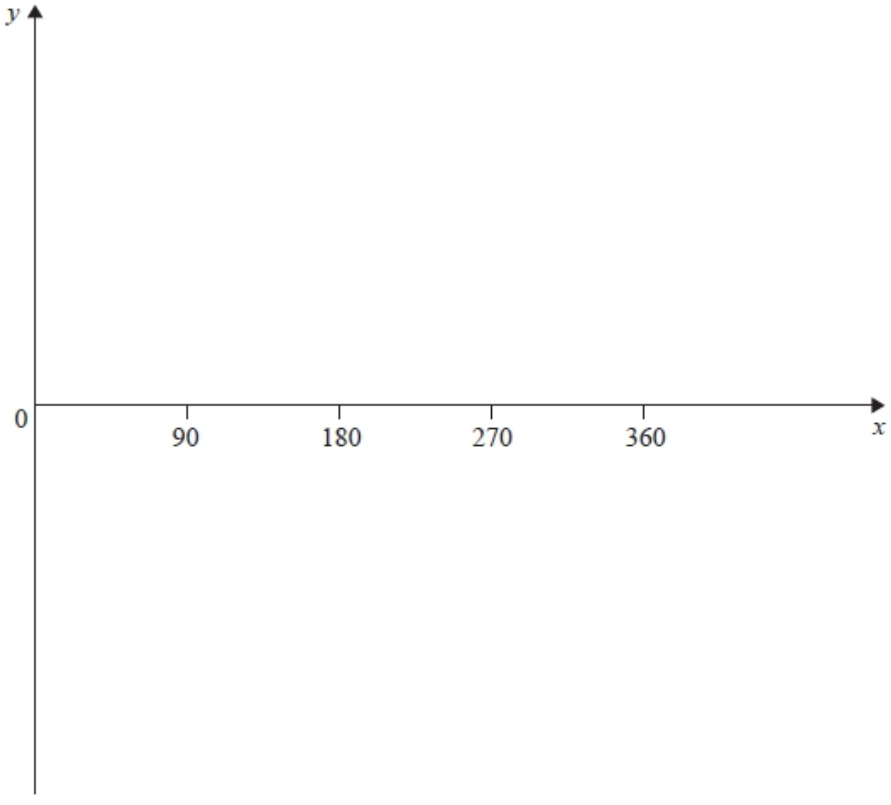
On the grid, sketch the curve with equation $y = 2^x$
Give the coordinates of any points of intersection with the axes.



(Total for question = 2 marks)

Q7.

Sketch the graph of $y = \tan x°$ for $0 \leq x \leq 360$



(Total for question = 2 marks)

Q8.

Louis and Robert are investigating the growth in the population of a type of bacteria.
They have two flasks A and B.

At the start of day 1, there are 1000 bacteria in flask A.
The population of bacteria grows exponentially at the rate of 50% per day.

(a) Show that the population of bacteria in flask A at the start of each day forms a geometric progression.

(2)

The population of bacteria in flask A at the start of the 10th day is k times the population of bacteria in flask A at the start of the 6th day.

(b) Find the value of k.

.....

(2)

At the start of day 1 there are 1000 bacteria in flask B.
The population of bacteria in flask B grows exponentially at the rate of 30% per day.

(c) Sketch a graph to compare the size of the population of bacteria in flask A and in flask B.

(1)

(Total for question = 5 marks)