

Write your name here

Surname

Other names

In the style of:

Edexcel GCSE

Centre Number

--	--	--	--	--	--

Candidate Number

--	--	--	--	--	--

Mathematics A

A* Type Questions 1H

Higher Tier

Extra topics that occur less frequently,
for students working towards an A*

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. 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.*
- **Calculators must not be used.**

Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

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.



1. Solve the equation $\frac{x}{2} - \frac{2}{x+1} = 1$

..... Q1

(Total 4 marks)



2. The diagram shows a solid wax cylinder.

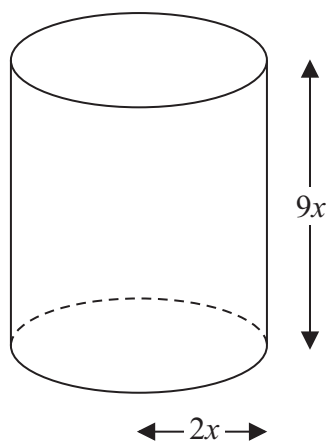


Diagram **NOT**
accurately drawn

The cylinder has base radius $2x$ and height $9x$.

The cylinder is melted down and made into a sphere of radius r .

Find an expression for r in terms of x .

.....
(Total for Question 2 is 3 marks)



3.

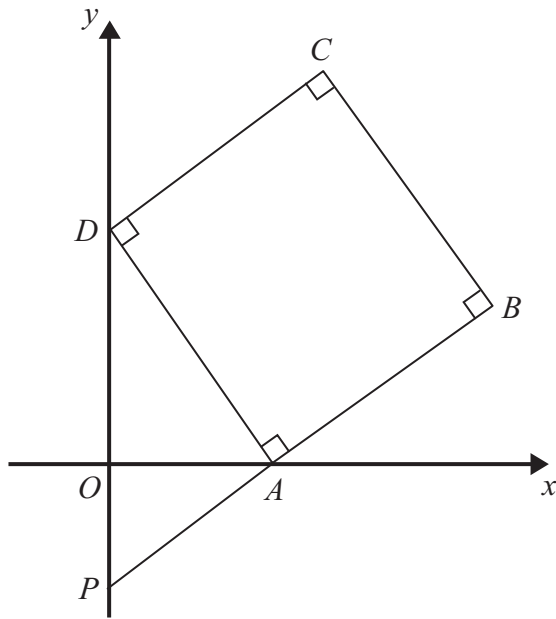


Diagram **NOT**
accurately drawn

$ABCD$ is a square.

P and D are points on the y -axis.

A is a point on the x -axis.

PAB is a straight line.

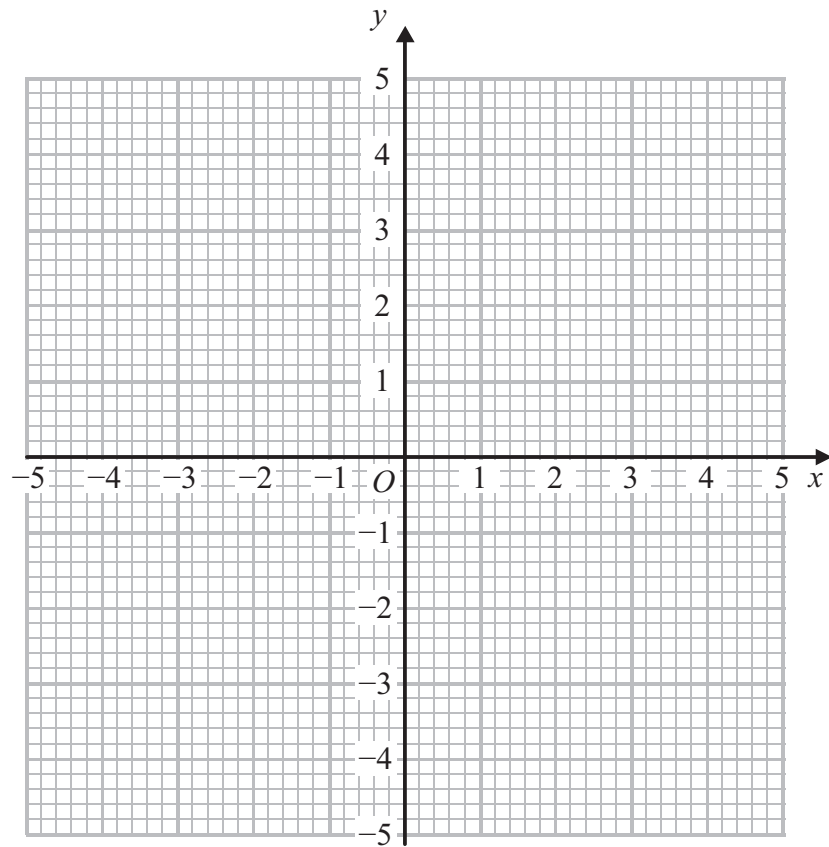
The equation of the line that passes through the points A and D is $y = -2x + 5$

Find the length of PD .

.....
(Total for Question 3 is 4 marks)

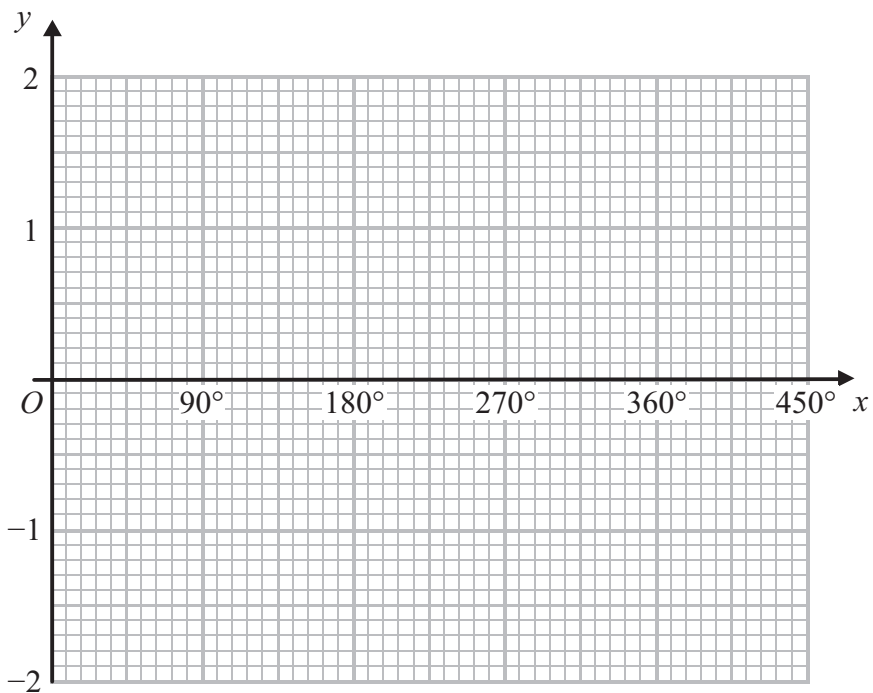


4.



(a) On the grid, draw the graph of $x^2 + y^2 = 4$

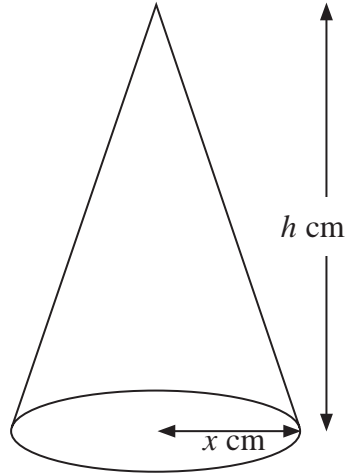
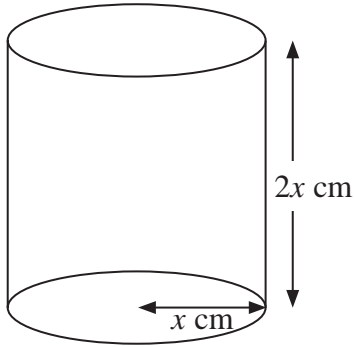
(2)



(b) On the grid, sketch the graph of $y = \cos x$ for $0^\circ \leq x \leq 360^\circ$



5.



Diagrams **NOT** accurately drawn

A cylinder has base radius x cm and height $2x$ cm.

A cone has base radius x cm and height h cm.

The volume of the cylinder and the volume of the cone are equal.

Find h in terms of x .

Give your answer in its simplest form.

$h = \dots\dots\dots$

Q5

(Total 3 marks)



6.

$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

$$u = 2\frac{1}{2}, v = 3\frac{1}{3}$$

(a) Find the value of f .

.....
(3)

(b) Rearrange $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$

to make u the subject of the formula.

Give your answer in its simplest form.

.....
(2)

(Total 5 marks)

Q6



7.

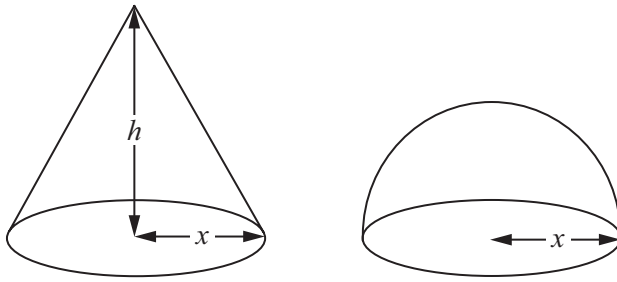


Diagram **NOT**
accurately drawn

The diagram shows a solid cone and a solid hemisphere.

The cone has a base of radius x cm and a height of h cm.

The hemisphere has a base of radius x cm.

The surface area of the cone is equal to the surface area of the hemisphere.

Find an expression for h in terms of x .

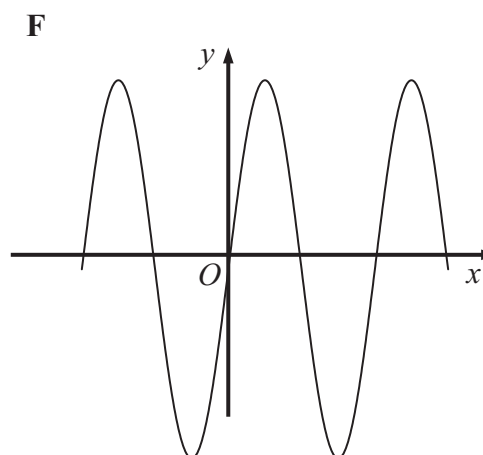
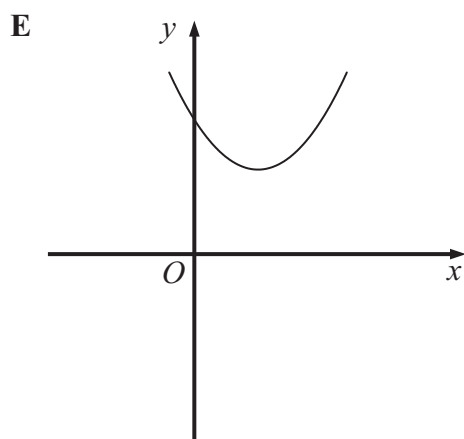
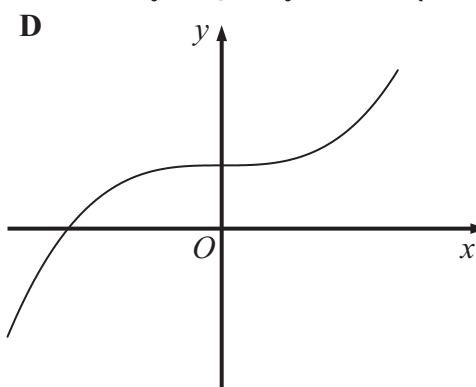
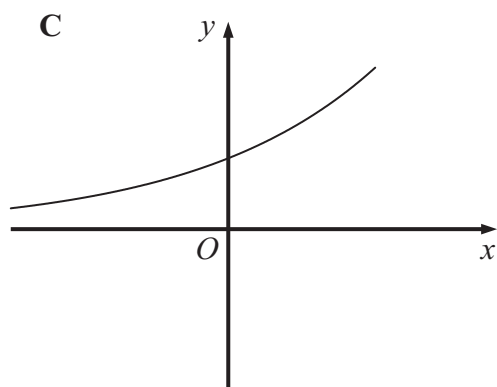
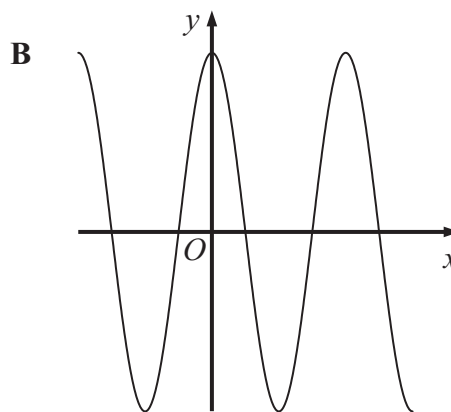
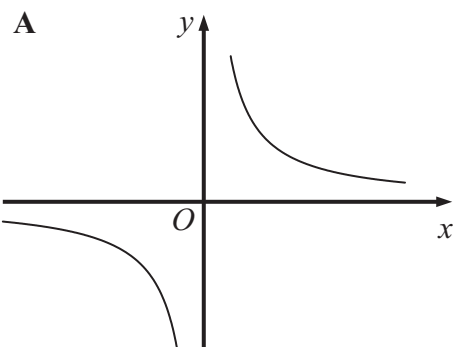
.....

Q7

(Total 4 marks)



8.



Each equation in the table represents one of the graphs A to F.

Write the letter of each graph in the correct place in the table.

Equation	Graph
$y = 4 \sin x^\circ$	
$y = 4 \cos x^\circ$	
$y = x^2 - 4x + 5$	
$y = 4 \times 2^x$	
$y = x^3 + 4$	
$y = \frac{4}{x}$	

(Total 3 marks)

Q8



9. Here is a shape $ABCDE$.

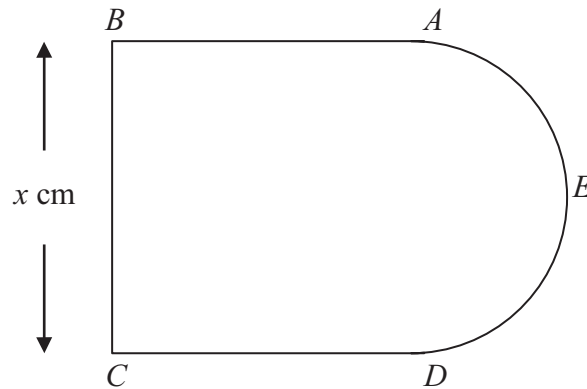


Diagram **NOT**
accurately drawn

AB , BC and CD are three sides of a square.

$BC = x$ cm.

AED is a semicircle with diameter AD .

The perimeter, P cm, of the shape $ABCDE$ is given by the formula

$$P = 3x + \frac{\pi x}{2}$$

(a) Rearrange this formula to make x the subject.

.....
(2)



The area, $A \text{ cm}^2$, of this shape is given by $A = kx^2$ where k is a constant.

- (b) Find the exact value of k .
Give your answer in its simplest form.

.....
(3) Q9
(Total 5 marks)

..... Q22
(Total 4 marks)



10. Express the recurring decimal $0.2\dot{1}\dot{3}$ as a fraction.

..... Q10
(Total 3 marks)



11.

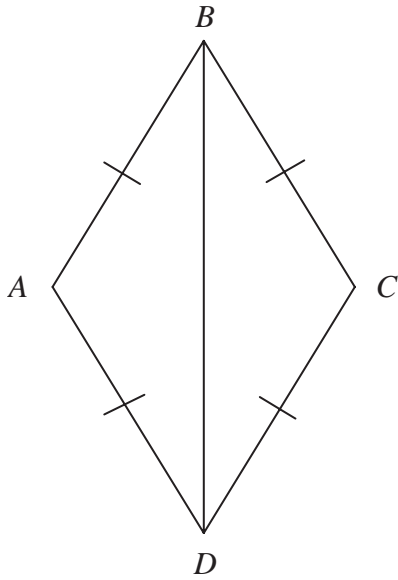


Diagram **NOT**
accurately drawn

In the diagram, $AB = BC = CD = DA$.

Prove that triangle ADB is congruent to triangle CDB .

Q11

(Total 3 marks)



12. Prove, using algebra, that the sum of two consecutive whole numbers is always an odd number.

(Total 3 marks)



13. The table shows information about the ages, in years, of 1000 teenagers.

Age (years)	13	14	15	16	17	18	19
Number of teenagers	158	180	165	141	131	115	110

Sophie takes a sample of 50 of these teenagers, stratified by age.

Calculate the number of 14 year olds she should have in her sample.

..... Q13

(Total 2 marks)

14. P is inversely proportional to V .

When $V = 8$, $P = 5$

(a) Find a formula for P in terms of V .

$P = \dots\dots\dots$
(3)

(b) Calculate the value of P when $V = 2$

..... Q14
(1)

(Total 4 marks)



15.

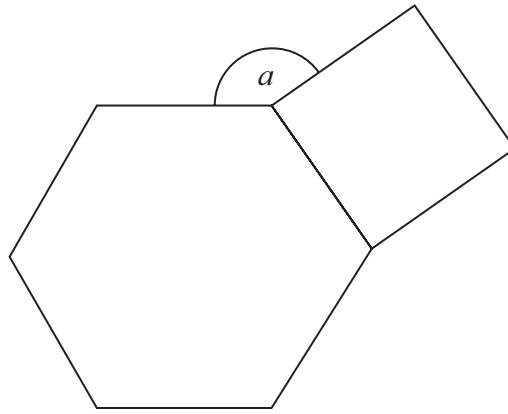


Diagram **NOT**
accurately drawn

The diagram shows a regular hexagon and a square.

Calculate the size of the angle a .

.....^o **Q15**
(Total 4 marks)

