Write your name here

Surname	Other Names

Mathematics

June 2017 Paper 2 (Calculator Allowed)
Part 2 (Second half of the paper)
Edexcel Higher Tier

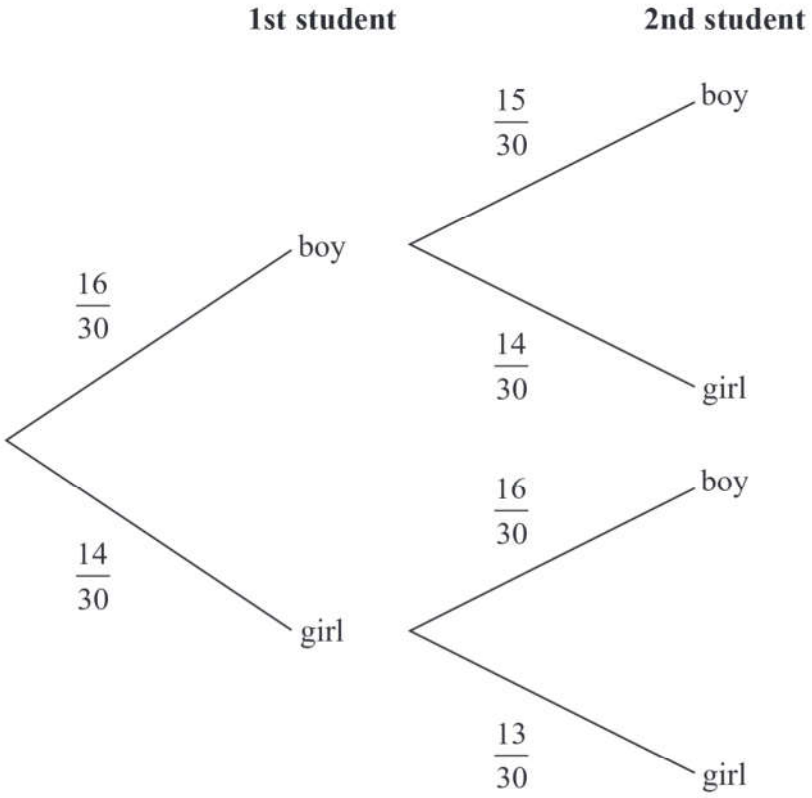
Time: 45 minutes

Q	Topic	Max Mark	My Marks
12	Probability (Conditional Probability)	2	
13	Histograms	3	
14	Trigonometric and Exponential Graphs	3	
15	Circle Theorems	3	
16	Converting Recurring Decimals to Fractions	3	
17	Area of any Triangle, Area of Sector	5	
18	Fractional Indices	3	
19	Adding Algebraic Fractions	4	
20	Simultaneous Equations on a Graph	5	
21	Pythagoras' Theorem, Circle Theorems	4	
22	Quadratic Nth Term	3	
23	The Equation of a Tangent	3	
	Total	41	

12 There are 30 students in Mr Lear's class.
16 of the students are boys.

Two students from the class are chosen at random.

Mr Lear draws this probability tree diagram for this information.



(a) Write down **one** thing that is wrong with the probabilities in the probability tree diagram.

.....

.....

(1)

Owen and Wasim play for the school football team.

The probability that Owen will score a goal in the next match is 0.4
The probability that Wasim will score a goal in the next match is 0.25

Mr Slater says,

"The probability that both boys will score a goal in the next match is 0.4 + 0.25"

(b) Is Mr Slater right?
Give a reason for your answer.

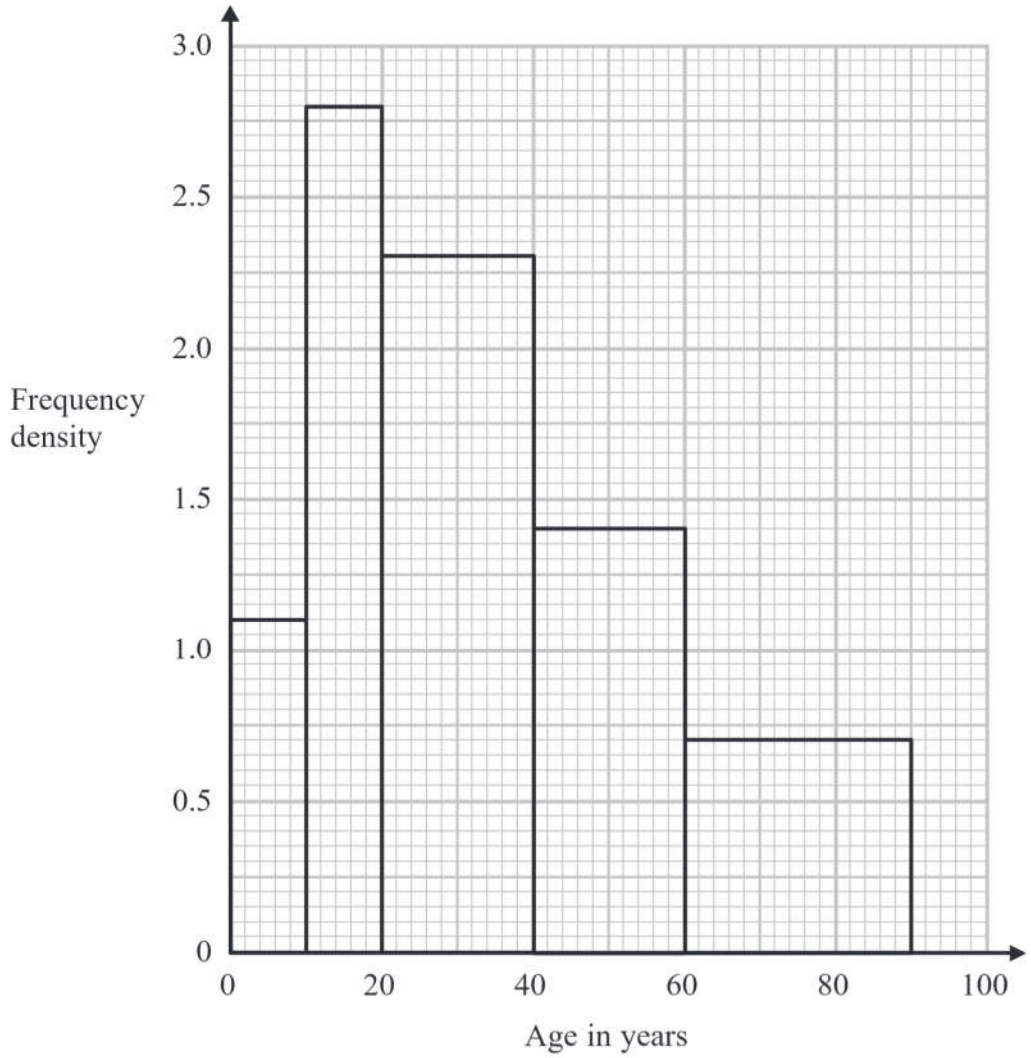
.....

.....

(1)

(Total for Question 12 is 2 marks)

13 The histogram shows some information about the ages of the 134 members of a sports club.



20% of the members of the sports club who are over 50 years of age are female.

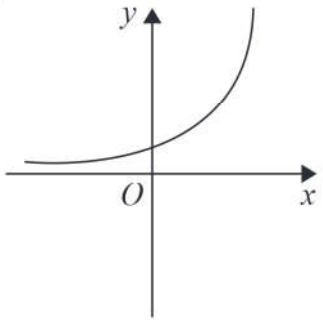
Work out an estimate for the number of female members who are over 50 years of age.

.....

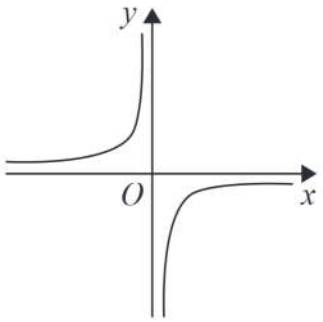
(Total for Question 13 is 3 marks)

14 Here are some graphs.

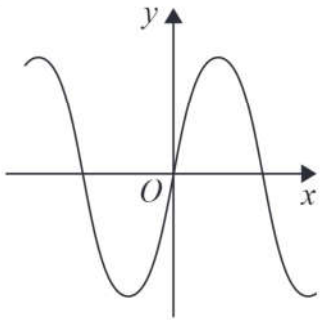
A



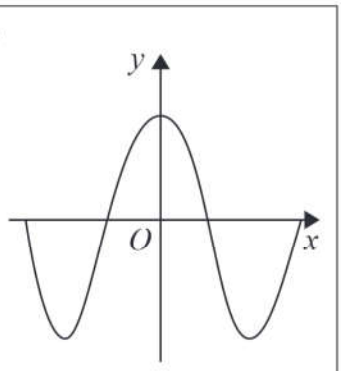
B



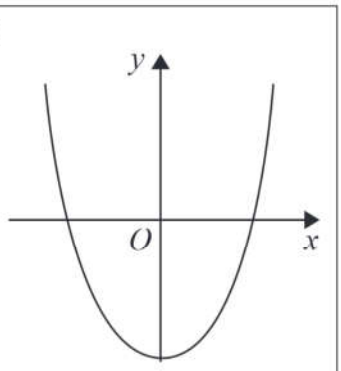
C



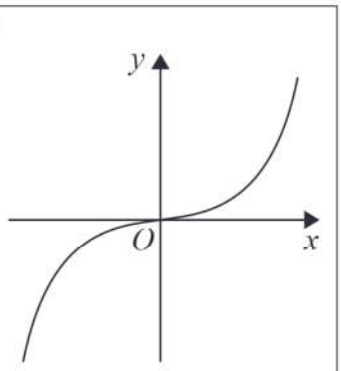
D



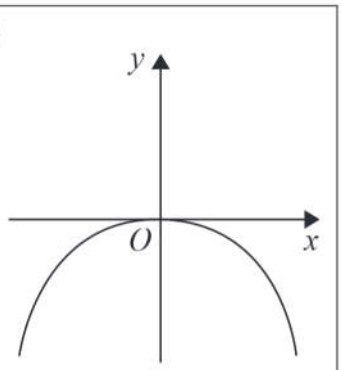
E



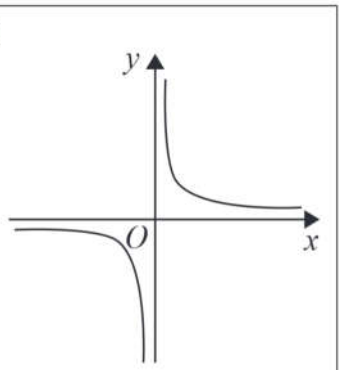
F



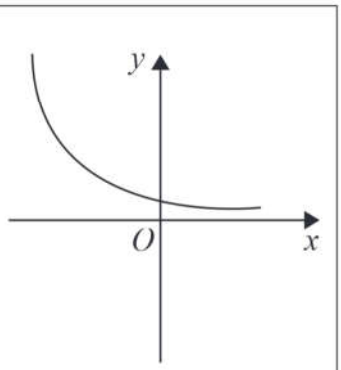
G



H



I

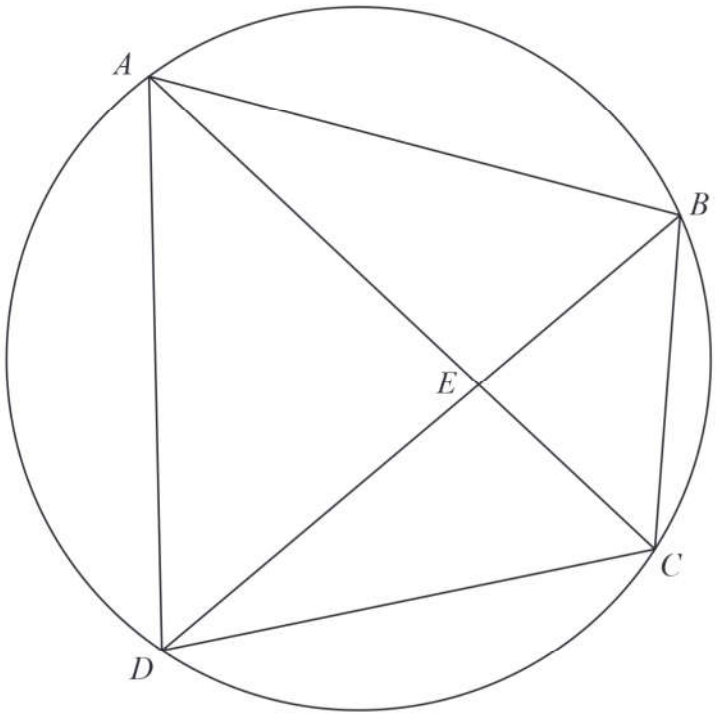


In the table below, match each equation with the letter of its graph.

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

(Total for Question 14 is 3 marks)

15 A, B, C and D are four points on the circumference of a circle.



AEC and BED are straight lines.

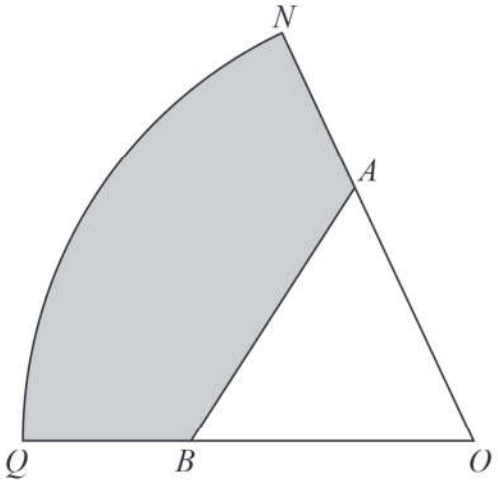
Prove that triangle ABE and triangle DCE are similar.
You must give reasons for each stage of your working.

(Total for Question 15 is 3 marks)

16 Using algebra, prove that $0.1\dot{3}\dot{6} \times 0.\dot{2}$ is equal in value to $\frac{1}{33}$

(Total for Question 16 is 3 marks)

17



ONQ is a sector of a circle with centre *O* and radius 11 cm.

A is the point on *ON* and *B* is the point on *OQ* such that *AOB* is an equilateral triangle of side 7 cm.

Calculate the area of the shaded region as a percentage of the area of the sector *ONQ*.
Give your answer correct to 1 decimal place.

.....%

(Total for Question 17 is 5 marks)

18 $16^{\frac{1}{5}} \times 2^x = 8^{\frac{3}{4}}$

Work out the exact value of x.

.....

(Total for Question 18 is 3 marks)

19 $2 - \dfrac{x+2}{x-3} - \dfrac{x-6}{x+3}$ can be written as a single fraction in the form $\dfrac{ax+b}{x^2-9}$ where a and b are integers.

Work out the value of a and the value of b.

$a =$ .....

$b =$ .....

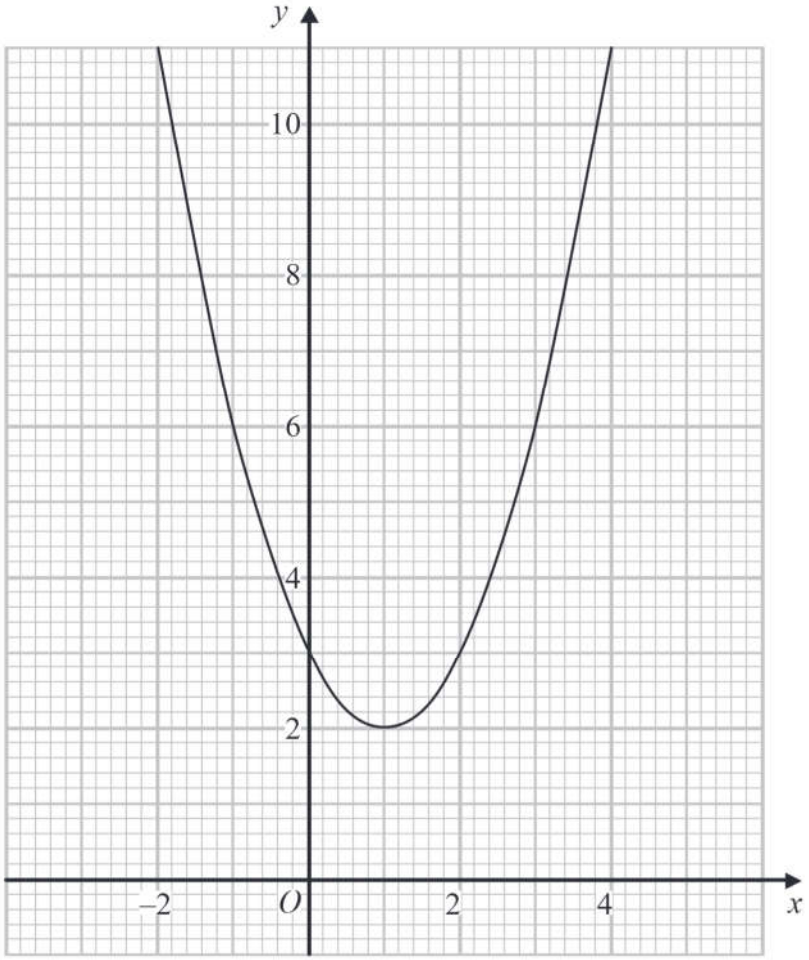
(Total for Question 19 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

20 The diagram shows part of the graph of $y = x^2 - 2x + 3$



(a) By drawing a suitable straight line, use your graph to find estimates for the solutions of $x^2 - 3x - 1 = 0$

.....

(2)

P is the point on the graph of $y = x^2 - 2x + 3$ where $x = 2$

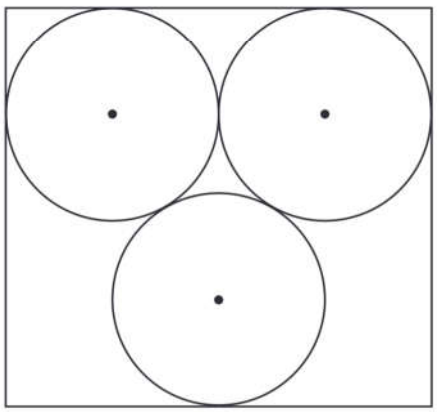
(b) Calculate an estimate for the gradient of the graph at the point P.

.....

(3)

(Total for Question 20 is 5 marks)

21 The diagram shows 3 identical circles inside a rectangle.
Each circle touches the other two circles and the sides of the rectangle, as shown in the diagram.



The radius of each circle is 24 mm.

Work out the area of the rectangle.
Give your answer correct to 3 significant figures.

..... mm^2

(Total for Question 21 is 4 marks)

22 Here are the first five terms of a sequence.

4 11 22 37 56

Find an expression, in terms of n, for the nth term of this sequence.

.....

(Total for Question 22 is 3 marks)

23 **L** is the circle with equation $x^2 + y^2 = 4$

$P\left(\frac{3}{2}, \frac{\sqrt{7}}{2}\right)$ is a point on **L**.

Find an equation of the tangent to **L** at the point P.

(Total for Question 23 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS