Write your name here

Surname	Other Names

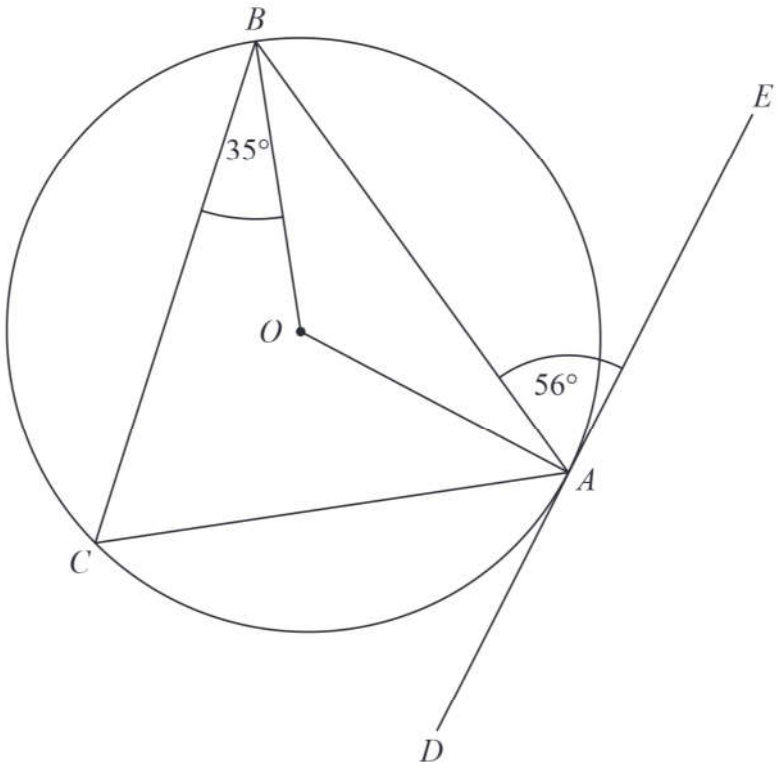
Mathematics

November 2018 Paper 1 (Non Calculator)
Part 2 (Second half of the paper)
Edexcel Higher Tier

Time: 45 minutes

Q	Topic	Max Mark	My Marks
12	Circle Theorems	3	
13	Negative Enlargement	2	
14	Negative and Fractional Indices	4	
15	Similar Shapes, Area and Volume	4	
16	Converting Recurring Decimals to Fractions	3	
17	Substitution, Completing the Square	4	
18	Graph Transformations	2	
19	Inverse and Composite Functions	4	
20	Surds Rationalise the Denominator	3	
21	Vectors Proof	5	
22	Probability Equation Questions	6	
	Total	40	

12



A, *B* and *C* are points on the circumference of a circle, centre *O*.
DAE is the tangent to the circle at *A*.

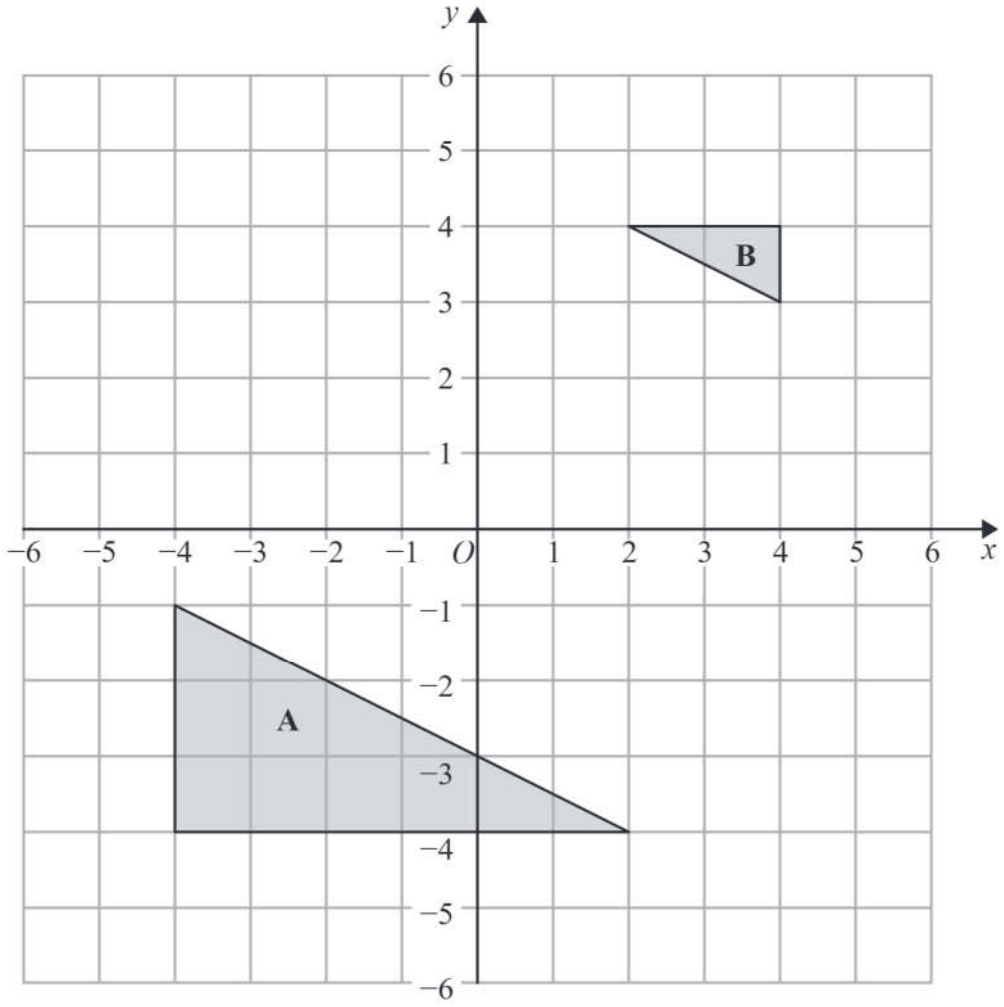
Angle *BAE* = 56°
Angle *CBO* = 35°

Work out the size of angle *CAO*.
You must show all your working.

.....°

(Total for Question 12 is 3 marks)

13



Describe fully the single transformation that maps triangle **A** onto triangle **B**.

.....

(Total for Question 13 is 2 marks)

14 (a) Work out the value of $\left(\frac{16}{81}\right)^{\frac{3}{4}}$

.....

(2)

$3^a = \frac{1}{9}$ $3^b = 9\sqrt{3}$ $3^c = \frac{1}{\sqrt{3}}$

(b) Work out the value of $a + b + c$

.....

(2)

(Total for Question 14 is 4 marks)

15 Three solid shapes **A**, **B** and **C** are similar.

The surface area of shape **A** is $4\,cm^2$
The surface area of shape **B** is $25\,cm^2$

The ratio of the volume of shape **B** to the volume of shape **C** is 27 : 64

Work out the ratio of the height of shape **A** to the height of shape **C**.
Give your answer in its simplest form.

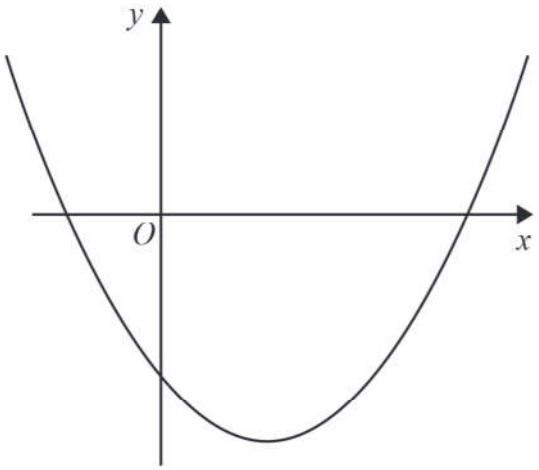
.....

(Total for Question 15 is 4 marks)

16 Prove algebraically that $0.2\dot{5}\dot{6}$ can be written as $\frac{127}{495}$

(Total for Question 16 is 3 marks)

17 Here is a sketch of a curve.



The equation of the curve is $y = x^2 + ax + b$ where a and b are integers.

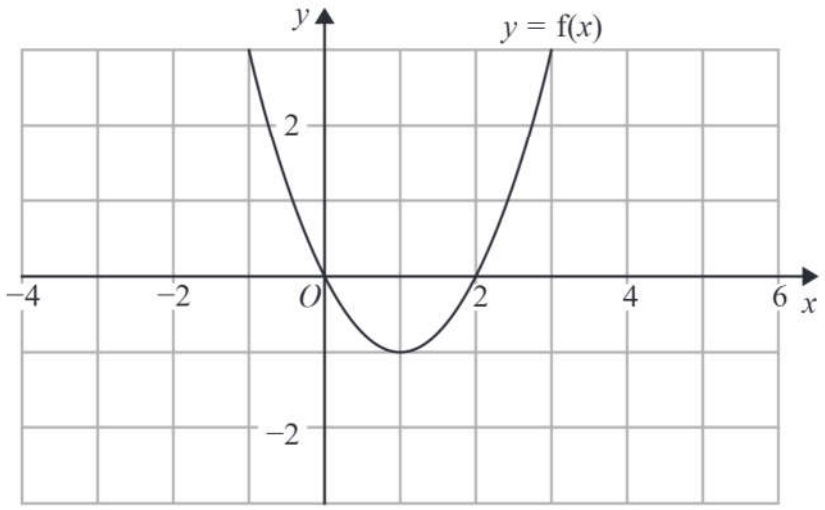
The points $(0, -5)$ and $(5, 0)$ lie on the curve.

Find the coordinates of the turning point of the curve.

(..... , ...)

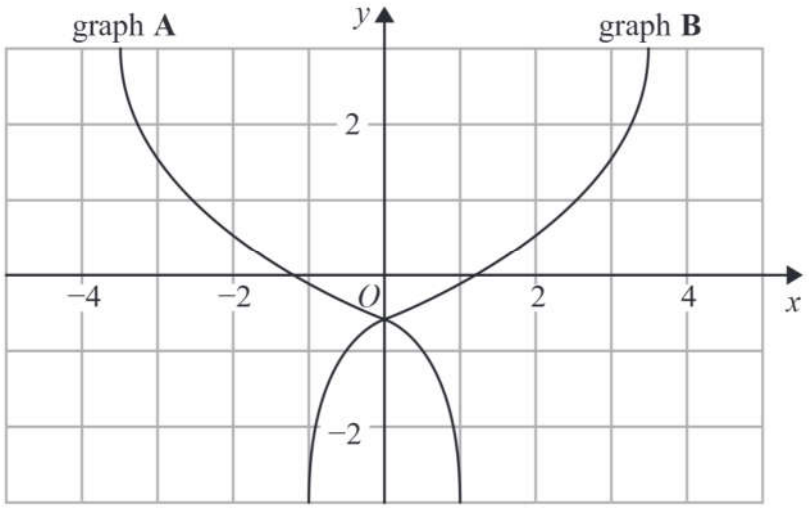
(Total for Question 17 is 4 marks)

18 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 18 is 2 marks)

19 For all values of x

$$f(x) = (x + 1)^2 \quad \text{and} \quad g(x) = 2(x - 1)$$

(a) Show that $gf(x) = 2x(x + 2)$

(2)

(b) Find $g^{-1}(7)$

.....

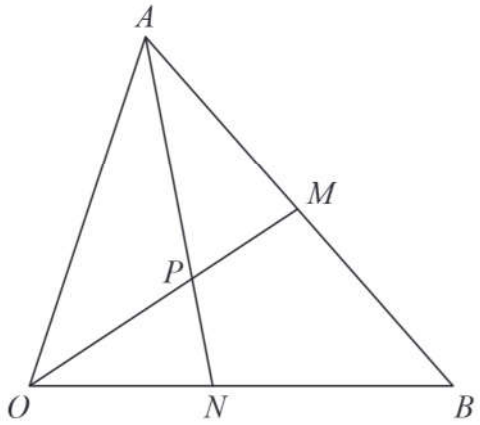
(2)

(Total for Question 19 is 4 marks)

20 Show that $\dfrac{(\sqrt{18}+\sqrt{2})^2}{\sqrt{8}-2}$ can be written in the form $a(b+\sqrt{2})$ where a and b are integers.

(Total for Question 20 is 3 marks)

21



OAB is a triangle.
OPM and *APN* are straight lines.
M is the midpoint of *AB*.

$\overrightarrow{OA} = \mathbf{a}$ $\overrightarrow{OB} = \mathbf{b}$

$OP : PM = 3 : 2$

Work out the ratio $ON : NB$

(Total for Question 21 is 5 marks)

22 There are only green pens and blue pens in a box.

There are three more blue pens than green pens in the box.
There are more than 12 pens in the box.

Simon is going to take at random two pens from the box.

The probability that Simon will take two pens of the same colour is $\frac{27}{55}$

Work out the number of green pens in the box.

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(Total for Question 22 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS