

Write your name here

Surname

Other Names

Mathematics

**November 2018 Paper 3 (Calculator Allowed)
Part 2 (Second half of the paper)
Edexcel Higher Tier**

Time: 45 minutes

Q	Topic	Max Mark	My Marks
10	Functions, Composite Functions	4	
11	Trigonometric Graphs	2	
12	3d Pythagoras and Trigonometry	4	
13	Iteration	2	
14	Inverse Proportion	3	
15	Algebraic Proof	3	
16	Sine Rule, Arc Length	5	
17	Histograms	5	
18	Bounds, Compound Measures (Speed)	5	
19	Quadratic Simultaneous Equations	5	
20	Combination of Transformations	2	
	Total	40	

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10 $f(x) = 4\sin x^\circ$

- (a) Find $f(23)$
Give your answer correct to 3 significant figures.

.....
(1)

$g(x) = 2x - 3$

- (b) Find $fg(34)$
Give your answer correct to 3 significant figures.

.....
(2)

$h(x) = (x + 4)^2$

Ivan needs to solve the following equation $h(x) = 25$

He writes

$(x + 4)^2 = 25$
 $x + 4 = 5$
 $x = 1$

This is not fully correct.

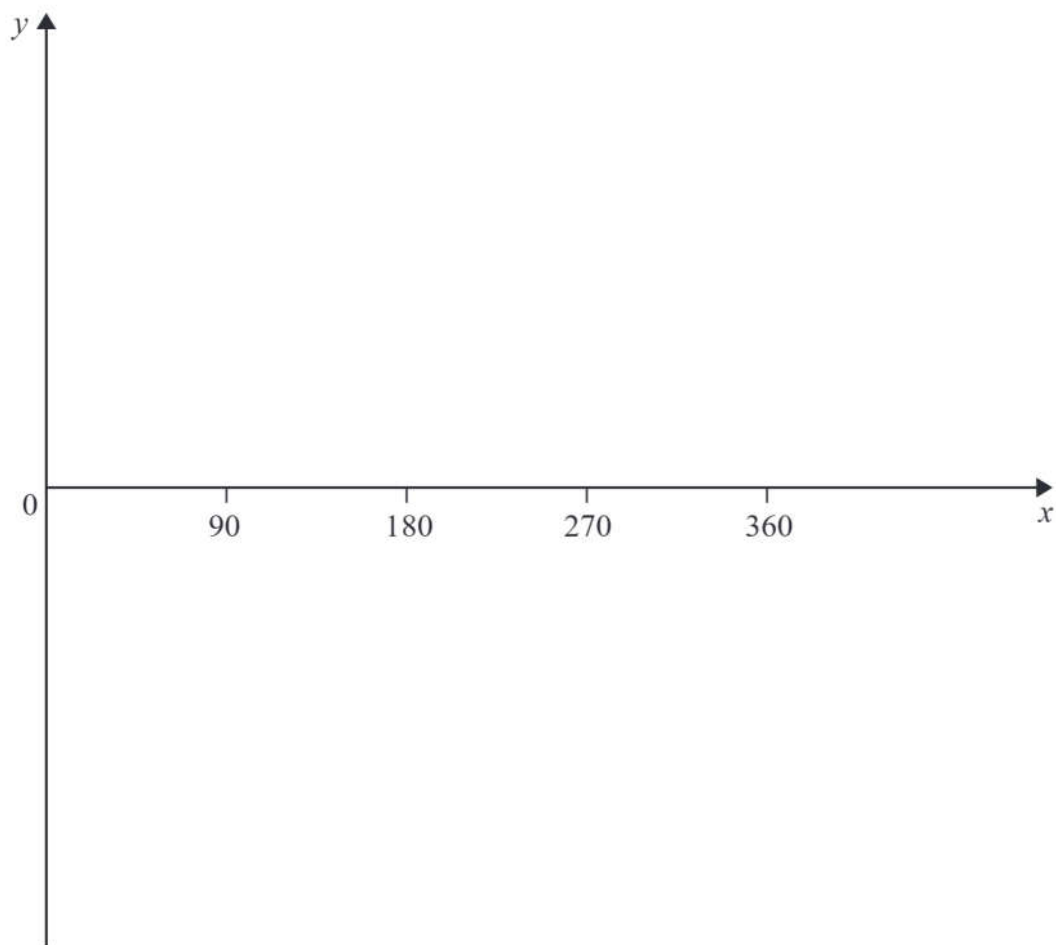
- (c) Explain why.

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

(Total for Question 10 is 4 marks)



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



(Total for Question 11 is 2 marks)

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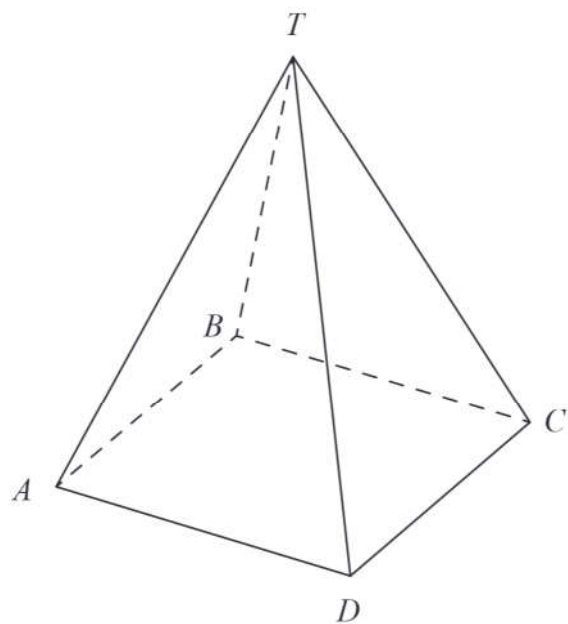


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12 Here is a pyramid with a square base $ABCD$.



$AB = 5 \text{ m}$

The vertex T is 12 m vertically above the midpoint of AC .

Calculate the size of angle TAC .

(Total for Question 12 is 4 marks)



- 13 The number of animals in a population at the start of year t is P_t .
The number of animals at the start of year 1 is 400

Given that

$$P_{t+1} = 1.01P_t$$

work out the number of animals at the start of year 3

(Total for Question 13 is 2 marks)

- 14 y is inversely proportional to x^3

$$y = 44 \text{ when } x = a$$

Show that $y = 5.5$ when $x = 2a$

(Total for Question 14 is 3 marks)



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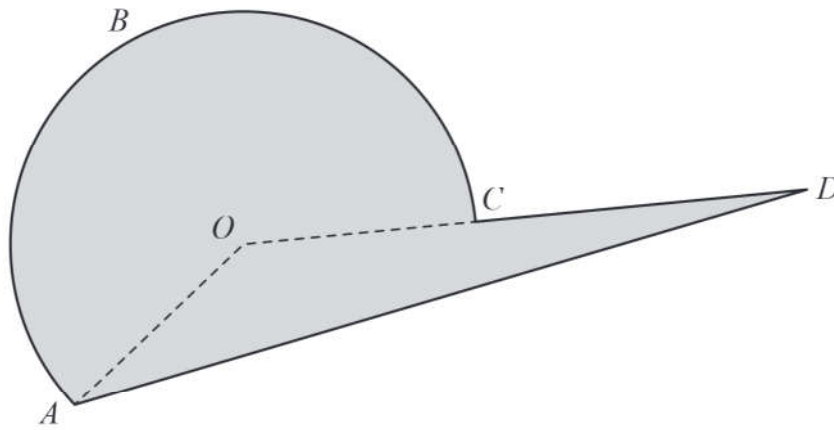
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15 Prove algebraically that the difference between the squares of any two consecutive odd numbers is always a multiple of 8

(Total for Question 15 is 3 marks)



16 Here is a shaded shape $ABCD$.



The shape is made from a triangle and a sector of a circle, centre O and radius 6 cm.
 OCD is a straight line.

$$AD = 14 \text{ cm}$$

$$\text{Angle } AOD = 140^\circ$$

$$\text{Angle } OAD = 24^\circ$$

Calculate the perimeter of the shape.
 Give your answer correct to 3 significant figures.

.....cm

(Total for Question 16 is 5 marks)



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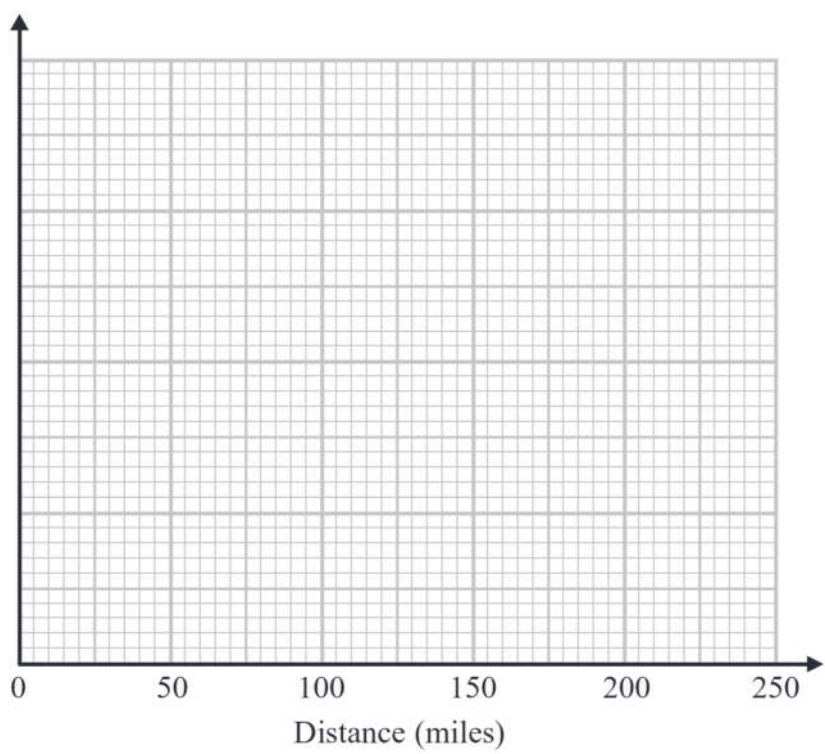
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17 The table shows information about the distances 570 students travelled to a university open day.

Distance (d miles)	Frequency
$0 < d \leq 20$	120
$20 < d \leq 50$	90
$50 < d \leq 80$	120
$80 < d \leq 150$	140
$150 < d \leq 200$	100

(a) Draw a histogram for the information in the table.



(3)

(b) Estimate the median distance.

..... miles
(2)

(Total for Question 17 is 5 marks)



18 A high speed train travels a distance of 487 km in 3 hours.

The distance is measured correct to the nearest kilometre.
The time is measured correct to the nearest minute.

By considering bounds, work out the average speed, in km/minute, of the train to a suitable degree of accuracy.

You must show all your working and give a reason for your answer.

.....km/minute

(Total for Question 18 is 5 marks)



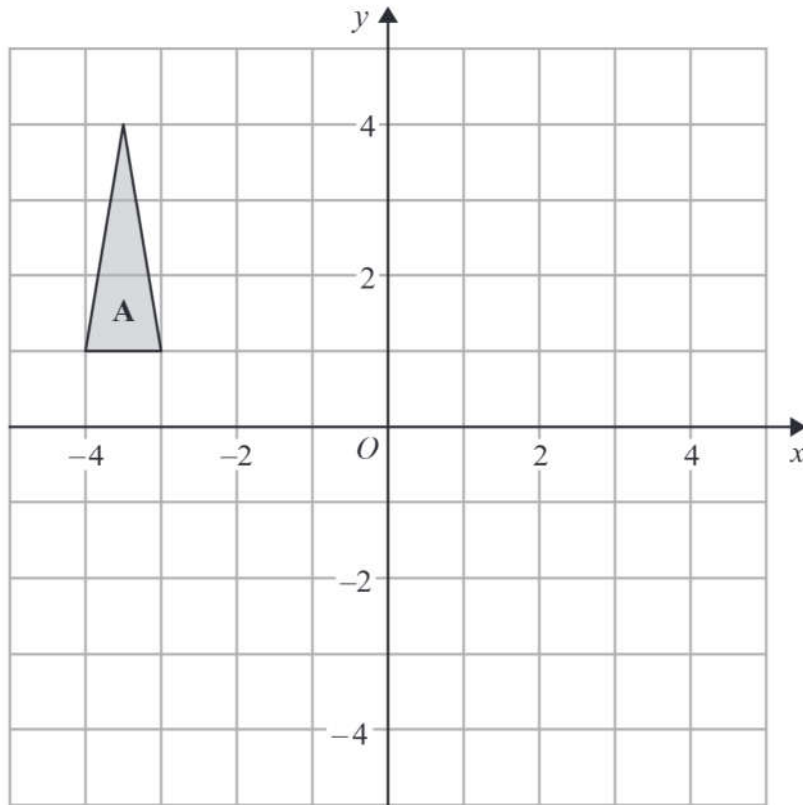
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19 Solve algebraically the simultaneous equations

$$\begin{aligned}2x^2 - y^2 &= 17 \\ x + 2y &= 1\end{aligned}$$

.....
(Total for Question 19 is 5 marks)





Triangle **A** is transformed by the combined transformation of a rotation of 180° about the point $(-2, 0)$ followed by a translation with vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

One point on triangle **A** is invariant under the combined transformation.

Find the coordinates of this point.

(.....,))

(Total for Question 20 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

