Write your name here

Surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9-1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 2 (Calculator)

Higher Tier

Mr Musson's Practice Paper 2

NOTE: THIS IS A BEST GUESS OF TOPICS THAT HAVE NOT YET APPEARED IN PAPER 1.

Paper Reference
1MA1/2H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. 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.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

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.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

Q1.

Ben and Lago have some identical packets.

Ben has 20 of the packets.
The total weight of Ben's packets is 32 kg.

Lago has 25 of the packets.

Work out the total weight of Lago's packets.

..... kg

(Total for question = 2 marks)

Q2.

The diagram shows the position of two boats, *B* and *C*.

Boat *T* is on a bearing of 060° from boat *B*.
Boat *T* is on a bearing of 285° from boat *C*.

In the space above, draw an accurate diagram to show the position of boat *T*.

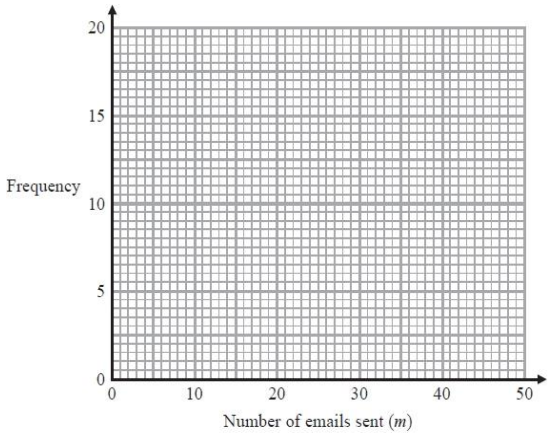
Mark the position of boat *T* with a cross (×).
Label it *T*.

(Total for Question is 3 marks)

Q3.

The frequency table gives information about the numbers of emails sent by 51 teachers on Monday.
(a) On the grid , draw a frequency polygon for this information.

Number of emails sent (m)	Frequency
$0 < m \leqslant 10$	5
$10 < m \leqslant 20$	17
$20 < m \leqslant 30$	14
$30 < m \leqslant 40$	9
$40 < m \leqslant 50$	6



(2)

*(b) Nalini says that at least a quarter of these teachers sent more than 30 emails.

Is Nalini correct?
You must explain your answer.

(2)

(Total for question = 4 marks)

Q4.

Bhavin buys a car in a sale.

Before the sale, the cost of the car was £6720
In the sale, the cost of every car is reduced by 20%.

Bhavin pays a deposit of £1500
He will pay the rest of the cost in 24 equal monthly payments.

Work out the amount of each monthly payment.
You must show all your working.

£ .....

(Total for question = 5 marks)

Q5.

Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist (w inches)	Frequency
Small	$28 < w \leqslant 32$	24
Medium	$32 < w \leqslant 36$	12
Large	$36 < w \leqslant 40$	8
Extra Large	$40 < w \leqslant 44$	6

(a) Calculate an estimate for the mean waist size.

..... inches

(3)

Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.
The modal size of belts sold is Small.

Jenny is going to order $\frac{3}{4}$ of the belts in size Small.

The manager of the shop tells Jenny she should **not** order so many Small belts.

(b) Who is correct, Jenny or the manager?
You must give a reason for your answer.

.....

.....

(2)

(Total for question is 5 marks)

Q6.

Jim rounds a number, x, to one decimal place.
The result is 7.2

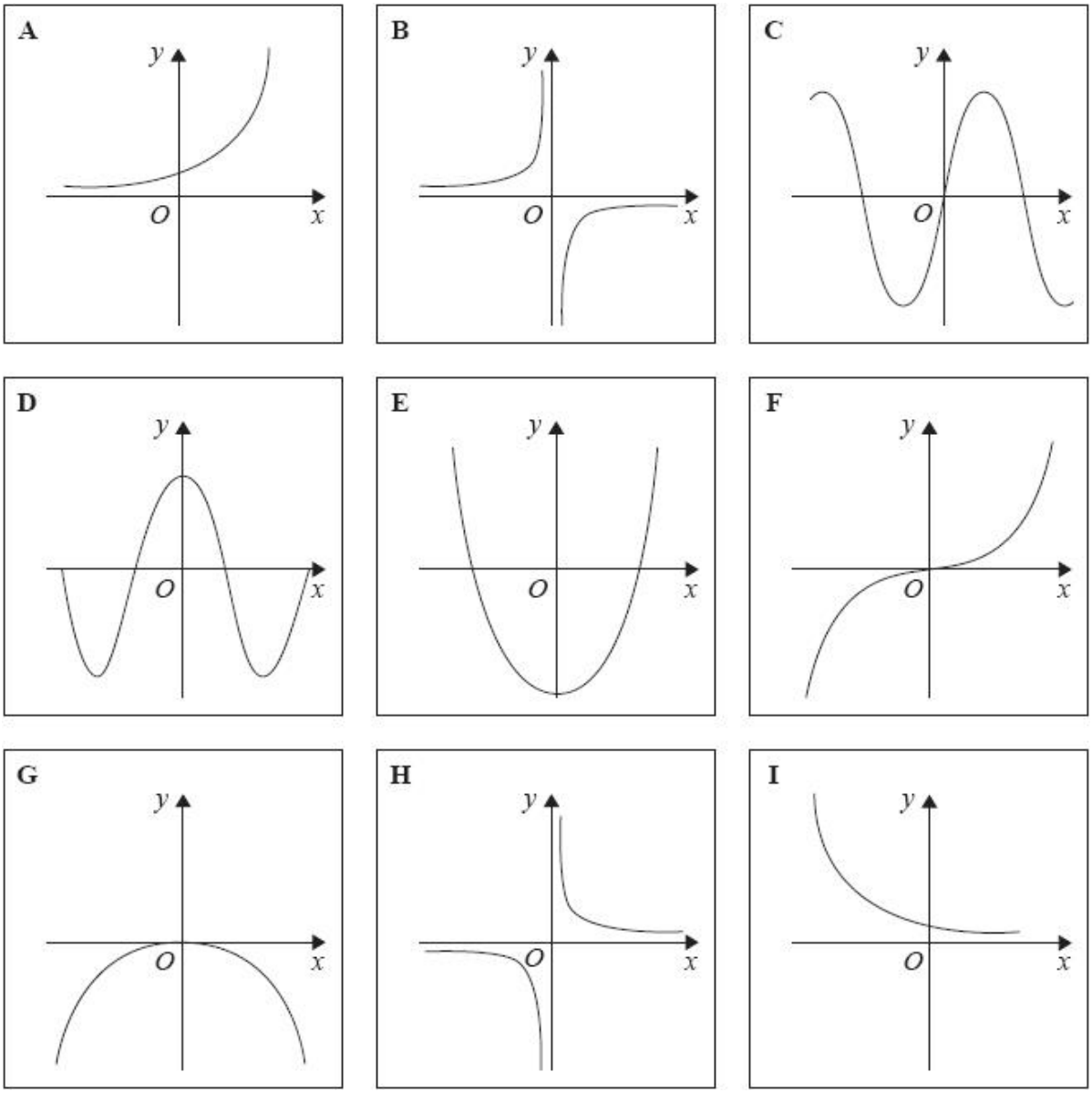
Write down the error interval for x.

.....

(Total for question = 2 marks)

Q7.

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)

Q8.
The diagram shows a pattern using four identical rhombuses.

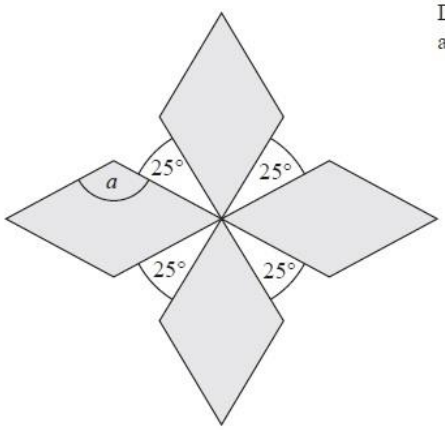


Diagram **NOT** accurately drawn

Work out the size of the angle marked *a*.

You must show your working.

..... °

(Total for Question is 4 marks)

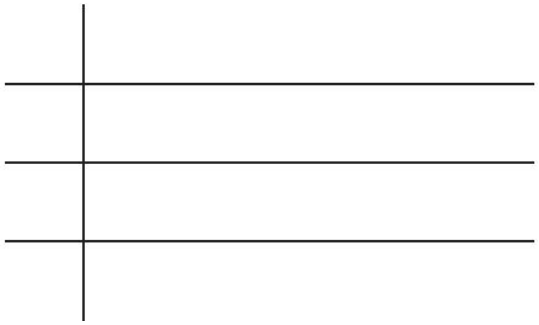
Q9.

Stephen plays in a basketball team.

The list shows the numbers of points Stephen scored in 15 games of basketball this year.

26 14 33 8 21 18 20 9 17 22 21 18 22 30 25

(a) Show this information in an ordered stem and leaf diagram.



(3)

Last year the ratio of the number of games Stephen's team won to the number of games Stephen's team did **not** win was 5 : 4

Last year Stephen's team played 36 games.

(b) Work out the number of games Stephen's team won last year.

.....

(2)

(Total for question = 5 marks)

Q10.

Susie has to deliver some packages and some parcels.

The total number of packages is 4 times the number of parcels.
The total number of packages and parcels is 40

Each parcel has a weight of 1.5 kg.
The total weight of the packages and parcels is 37.6 kg.

Each of the packages has the same weight.

Work out the weight of each package.

. . . . . kg

(Total for Question is 4 marks)

Q11.

ABCDEFGHI is a regular 9-sided polygon.

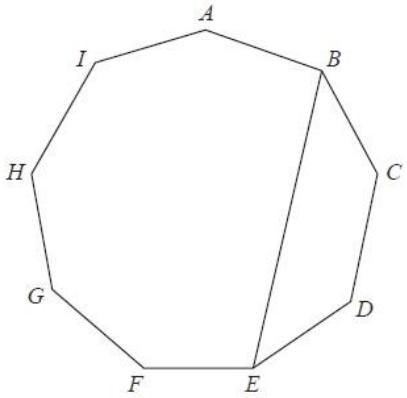


Diagram **NOT** accurately drawn

The vertices *B* and *E* are joined with a straight line.

Work out the size of angle *BEF*.
You must show how you get your answer.

..... °

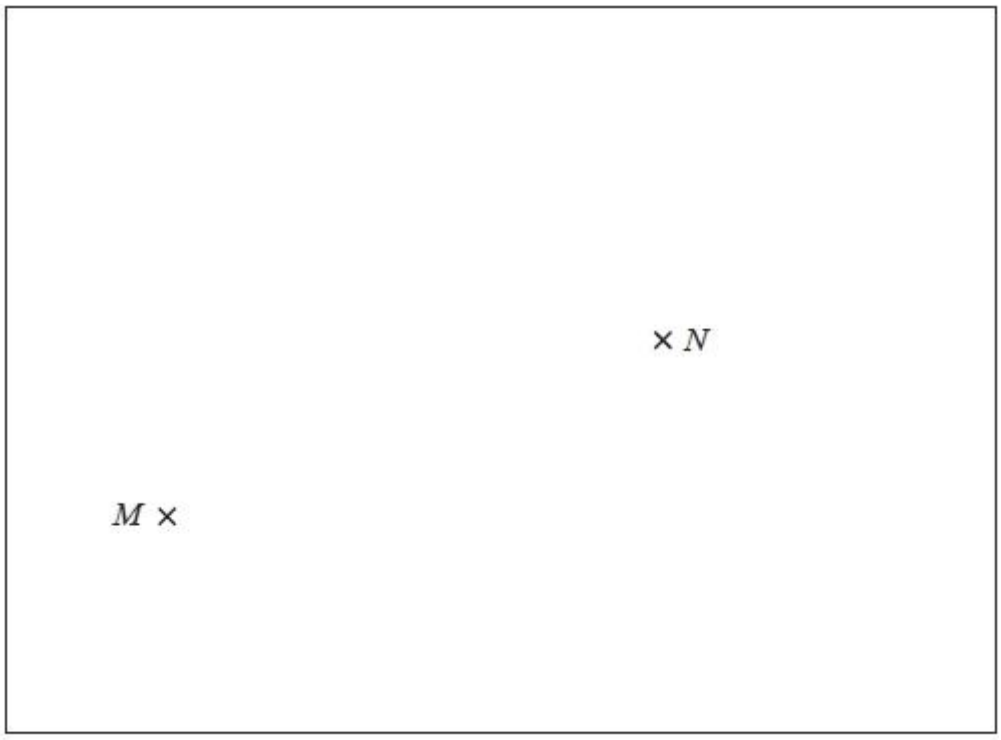
(Total for question = 4 marks)

Q12.

Here is a map.
The map shows two towns Marlford (*M*) and Newborough (*N*).

A company is going to build a supermarket.
The supermarket will be more than 10 km from Marlford and less than 6 km from Newborough.

Find and shade the region on the map where the company can build the supermarket.



Scale: 1 cm represents 2 km.

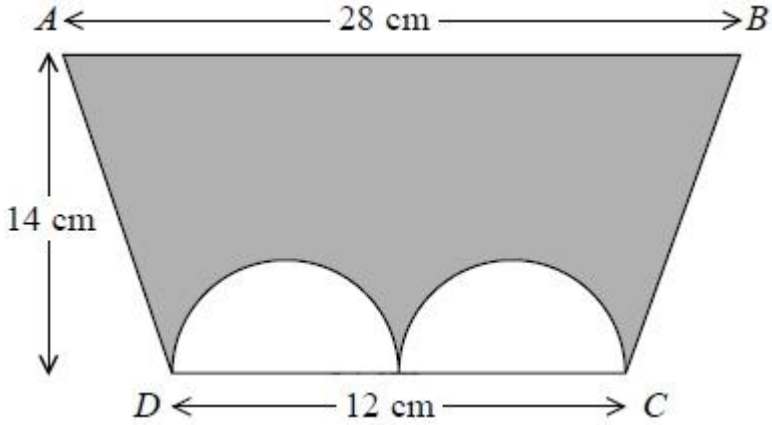
(Total for question = 3 marks)

13.

The diagram shows a trapezium *ABCD* and two identical semicircles.

The centre of each semicircle is on *DC*.

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



..... cm^2

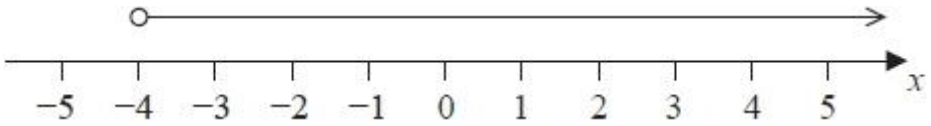
(Total for question = 4 marks)

Q14.

Prove algebraically that the recurring decimal $0.1\dot{7}\dot{8}$ can be written as the fraction $\frac{59}{330}$

(Total for question = 3 marks)

Q15.



(a) Write down the inequality represented on the number line.

.....

(1)

(b) Solve $4y - 9 \leq 3$

.....

(2)

(c)

$-3 \leq n < 2$
$-2 < m < 4$

n and m are integers.

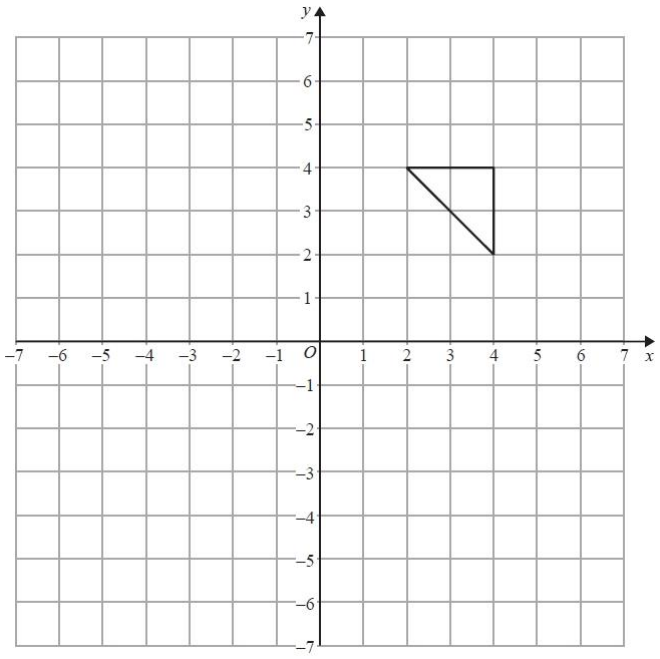
Given that $n = m$, write down all the possible values of n.

.....

(2)

(Total for question = 5 marks)

16.



On the grid, enlarge the triangle by scale factor –1½, centre (0, 2)

(Total for question = 2 marks)

Q17.

(a) Expand and simplify $3(x + 4) + 2(5x - 1)$

.....

(2)

(b) Expand and simplify $(2x + 1)(x - 4)$

.....

(2)

(c) Factorise completely $6y^2 - 9xy$

.....

(2)

(Total for Question is 6 marks)

Q18.

(a) Expand and simplify $(x + 2)(2x - 3)(3x + 1)$

.....

(3)

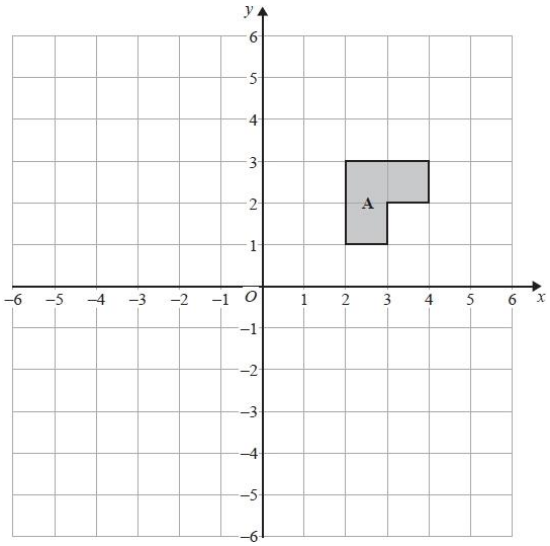
(b) Simplify $n^4 \div n^{\frac{1}{2}}$

.....

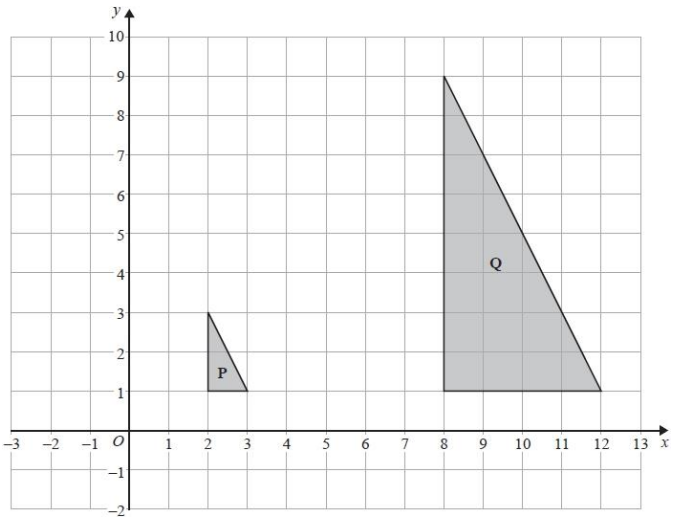
(1)

(Total for question = 4 marks)

19. (a) Rotate shape **A** 180° about the point (0, 0).



(2)



(b) Describe fully the single transformation which maps triangle **P** onto triangle **Q**.

.....

.....

(3)

(Total for question = 5 marks)

Q20.

(a) Simplify $ab - 5g + 5ab - 2g$

.....

(2)

(b) Factorise $6m - 9$

.....

(1)

(c) Simplify $t^8 \div t^3$

.....

(1)

(d) Factorise fully $2x^2y + 4xy^2$

.....

(2)

(e) Expand and simplify $(w - 5)^2$

.....

(2)

(Total for question = 8 marks)

Q21.

The product of two consecutive positive integers is added to the larger of the two integers.

Prove that the result is always a square number.

(Total for question = 3 marks)

Q22.

(a) Simplify fully $\dfrac{2x^2 - 5x + 3}{x^2 + 5x - 6}$

.....

(3)

(b) Make *m* the subject of

$$\frac{m}{v} - \frac{t}{b} = \frac{m - t}{R}$$

.....

(4)

(Total for question = 7 marks)

Q23.

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 = 3 marks)

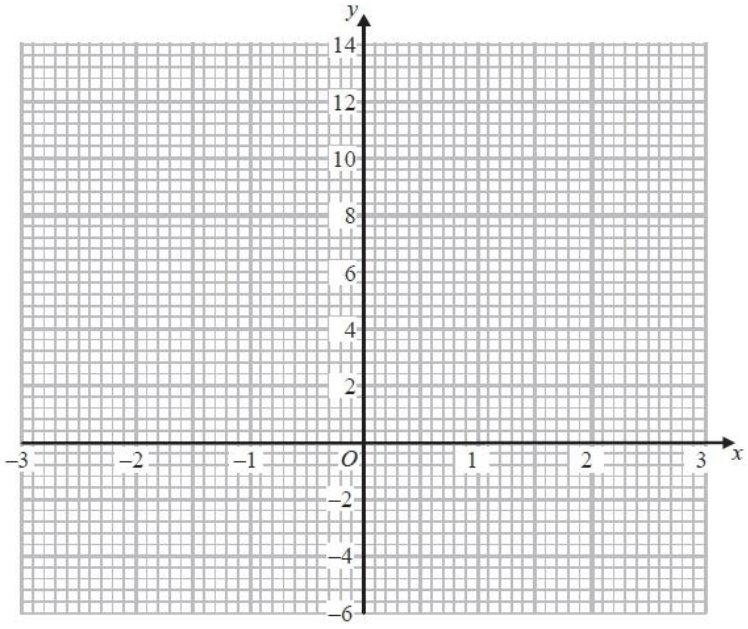
Q24.

(a) Complete the table of values for $y = x^3 - 6x + 4$

x	−3	−2	−1	0	1	2	3
y	−5		9			0	13

(2)

(b) On the grid, draw the graph of $y = x^3 - 6x + 4$ for values of x from −3 to 3



(2)

(Total for question = 4 marks)

Q25.

In a sale normal prices are reduced by 20%.

A washing machine has a sale price of £464

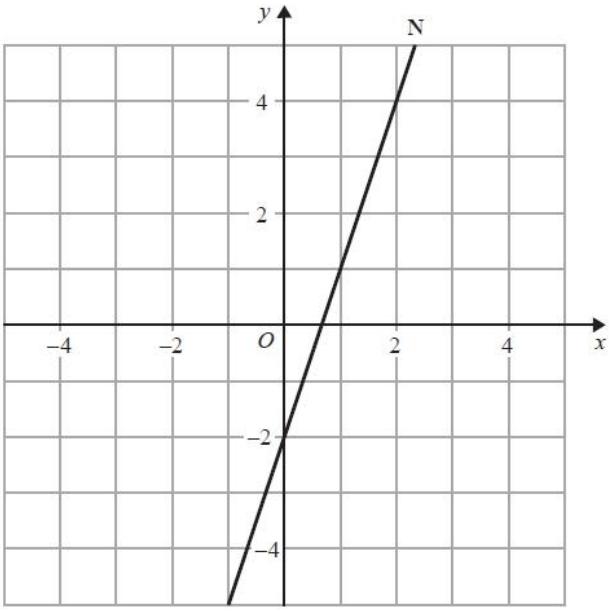
By how much money is the normal price of the washing machine reduced?

£ .....

(Total for Question is 3 marks)

Q26.

The line **N** is drawn below.



Find an equation of the line perpendicular to line **N** that passes through the point (0, 1).

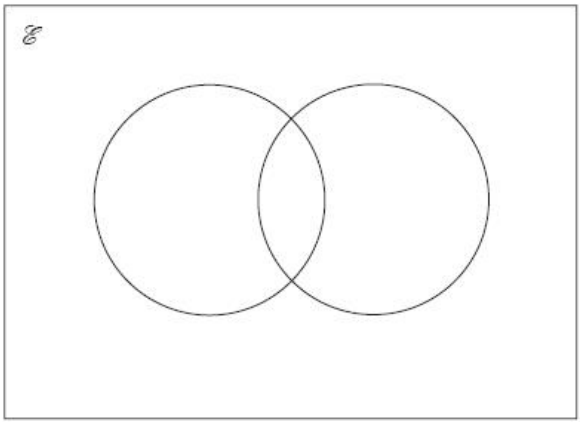
.....

(Total for question = 3 marks)

Q27.

$\mathscr{E}$ = odd numbers less than 30
A = 3, 9, 15, 21, 27
B = 5, 15, 25

(a) Complete the Venn diagram to represent this information.



(4)

A number is chosen at random from the universal set, $\mathscr{E}$.

(b) What is the probability that the number is in the set $A \cup B$?

.....

(2)

(Total for question = 6 marks)

Q28.

Kiera used her calculator to work out the value of a number x.
She wrote down the first two digits of the answer on her calculator.

She wrote down 7.3

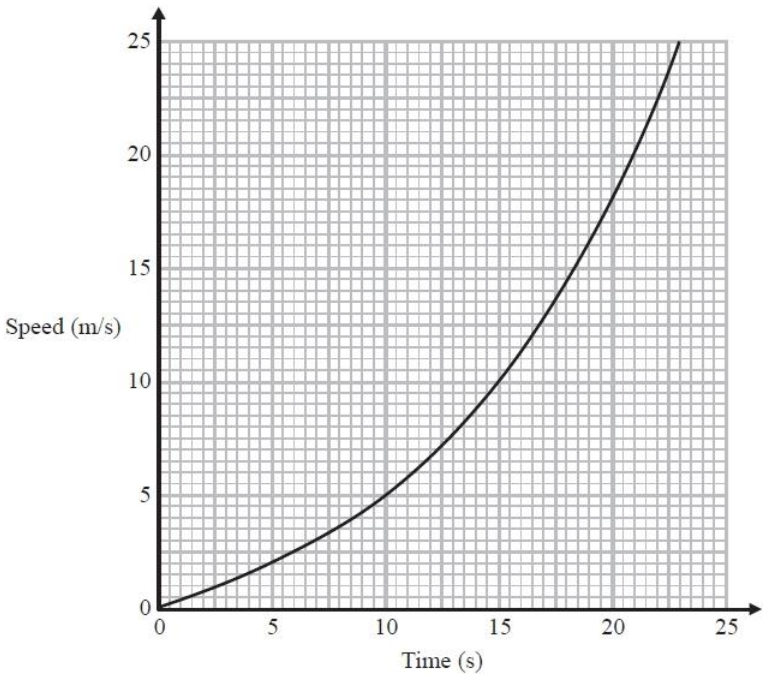
Write down the error interval for x.

.....

(Total for question = 2 marks)

Q29.

Here is a speed-time graph for a train.



(a) Work out an estimate for the distance the train travelled in the first 20 seconds.

Use 4 strips of equal width.

..... m

(3)

(b) Is your answer to (a) an underestimate or an overestimate of the actual distance the train travelled?

Give a reason for your answer.

.....

.....

(1)

(Total for question = 4 marks)

Q30.

* The Singh family and the Peterson family go to the cinema.

The Singh family buy 2 adult tickets and 3 child tickets. They pay £28.20 for the tickets.

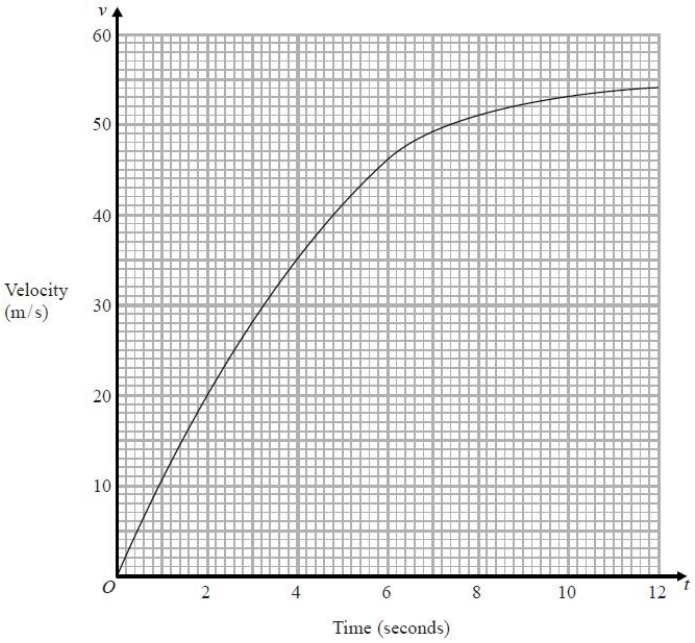
The Peterson family buy 3 adult tickets and 5 child tickets. They pay £44.75 for the tickets.

Find the cost of each adult ticket and each child ticket.

(Total for question = 5 marks)

Q31.

The graph shows information about the velocity, v m/s, of a parachutist t seconds after leaving a plane.



(a) Work out an estimate for the acceleration of the parachutist at $t = 6$

..... m/s^2

(2)

(b) Work out an estimate for the distance fallen by the parachutist in the first 12 seconds after leaving the plane.
Use 3 strips of equal width.

..... m

(3)

(Total for question is 5 marks)

Q32.

$-2 \leq n < 3$

n is an integer.

(a) Write down all the possible values of n.

.....

(2)

(b) Solve $4 - x < 2x - 5$

.....

(2)

(Total for question = 4 marks)

Q33.

Solve the simultaneous equations

$5x + 2y = -2$
$3x - 5y = 11.2$

$x =$ .....

$y =$ .....

(Total for question = 4 marks)

Q34.

(a) Find the reciprocal of 2.5

.....

(1)

(b) Work out $\sqrt[3]{\dfrac{4.3 \times \tan 39^\circ}{23.4 - 6.06}}$

Give your answer correct to 3 significant figures.

.....

(2)

(Total for question is 3 marks)

Q35.

(a) Given that x and y are integers such that

$$3 < x < 7$$
$$4 < y < 9$$
$$\text{and } x + y = 13$$

find all the possible values of x.

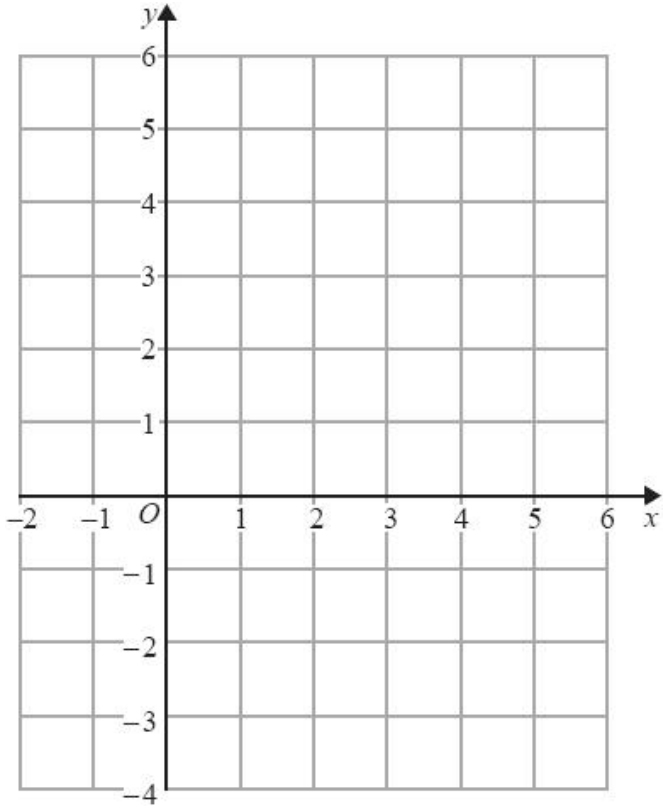
.....

(2)

(b) On the grid below show, by shading, the region defined by the inequalities

$y \geqslant -1$ $y \leqslant 4 - x$ $y \leqslant 3x - 1$

Mark this region with the letter R.



(4)

(Total for question = 6 marks)

Q36.

The diagram shows the positions of three turbines *A*, *B* and *C*.

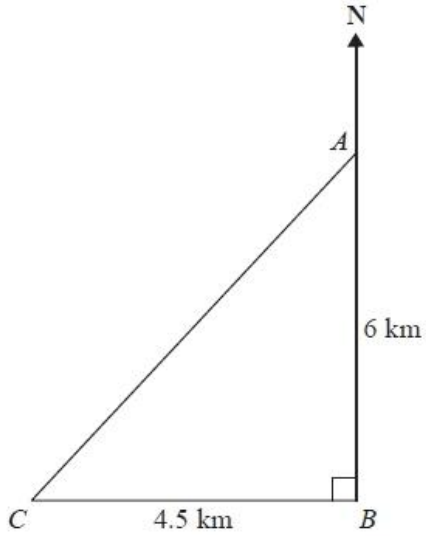


Diagram **NOT** accurately drawn

A is 6 km due north of turbine *B*.
C is 4.5 km due west of turbine *B*.

(a) Calculate the distance *AC*.

.....km
(3)

(b) Calculate the bearing of *C* from *A*.
Give your answer correct to the nearest degree.

.....°
(4)

(Total for Question is 7 marks)

Q37.

ABC is a right-angled triangle.
D is a point on *AB*.

Angle *ACD* = 30°
AD = 10.4 cm
DB = 5.2 cm
AC = 18 cm

Work out the size of the angle marked *x*.
Give your answer correct to 1 decimal place.

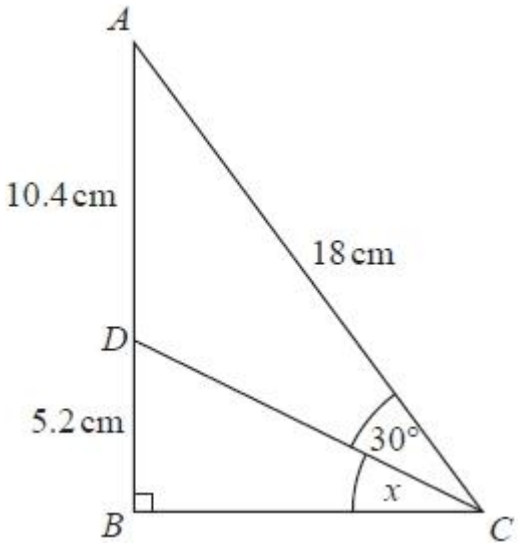


Diagram **NOT** accurately drawn

..... °

(Total for question = 4 marks)

38.

ABC is a triangle.

AC = 8.4m
Angle *ACB* = 40°

The area of the triangle = 100m^2.

Work out the length of *AB*.
Give your answer correct to 3 significant figures.
You must show all your working.

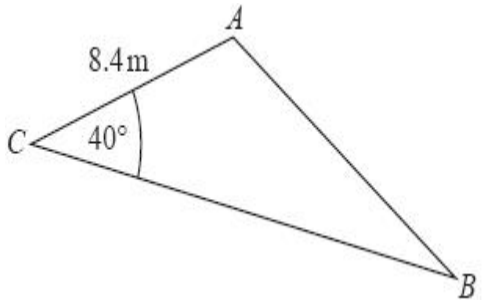


Diagram **NOT** accurately drawn

..... m

(Total for question = 5 marks)

Q39.

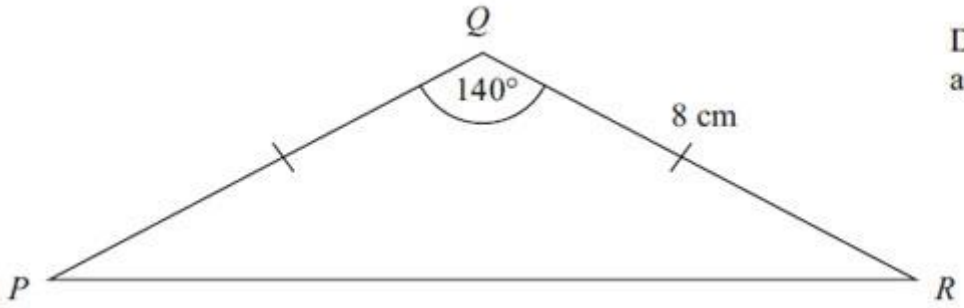


Diagram **NOT** accurately drawn

Calculate the length of *PR*.
Give your answer correct to 3 significant figures.

.....

(Total for Question is 3 marks)

Q40.

Liquid **A** has a density of 1.42 g/cm^3

7 cm^3 of liquid **A** is mixed with 125 cm^3 of liquid **B** to make liquid **C**.

Liquid **C** has a density of 1.05 g/cm^3

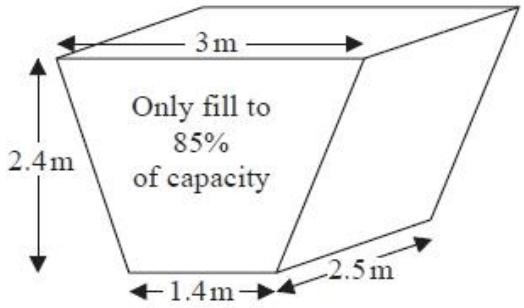
Find the density of liquid **B**.
Give your answer correct to 2 decimal places.

..... g/cm^3

(Total for question = 3 marks)

Q41.

The diagram shows an oil tank in the shape of a prism.
The cross section of the prism is a trapezium.



The tank is empty.

Oil flows into the tank.
After one minute there are 300 litres of oil in the tank.

Assume that oil continues to flow into the tank at this rate.

(a) Work out how many **more** minutes it takes for the tank to be 85 full of oil.
(1 m^3 = 1000 litres)

..... minutes

(5)

The assumption about the rate of flow of the oil could be wrong.

(b) Explain how this could affect your answer to part (a).

.....

.....

(1)

(Total for question = 6 marks)

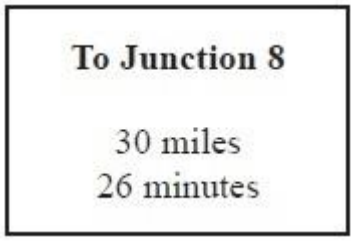
Q42.

* Axel and Lethna are driving along a motorway.

They see a road sign.

The road sign shows the distance to Junction 8

It also shows the average time drivers will take to get to Junction 8



The speed limit on the motorway is 70 mph. Lethna says, 'We will have to drive faster than the speed limit to go 30 miles in 26 minutes.' Is Lethna right?

You must show how you got your answer.

(Total for Question is 3 marks)

Q43.

(a) Expand and simplify $(y + 2)(y + 5)$

.....

(2)

(b) Factorise $e^2 + e - 12$

.....

(2)

(c) Solve $3x^2 - x - 1 = 0$

Give your solutions correct to 2 decimal places.

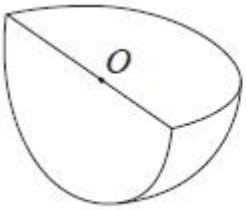
.....

(3)

(Total for question = 7 marks)

Q44.

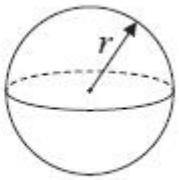
Shape **S** is one quarter of a solid sphere, centre *O*.



Shape **S**

Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$



The volume of **S** is 576π cm^3

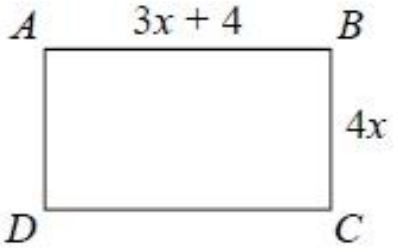
Find the surface area of **S**.
Give your answer correct to 3 significant figures.
You must show your working.

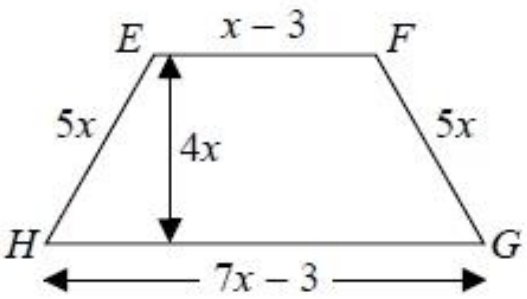
..... cm^2

(Total for question = 5 marks)

Q45.

ABCD is a rectangle.
EFGH is a trapezium.





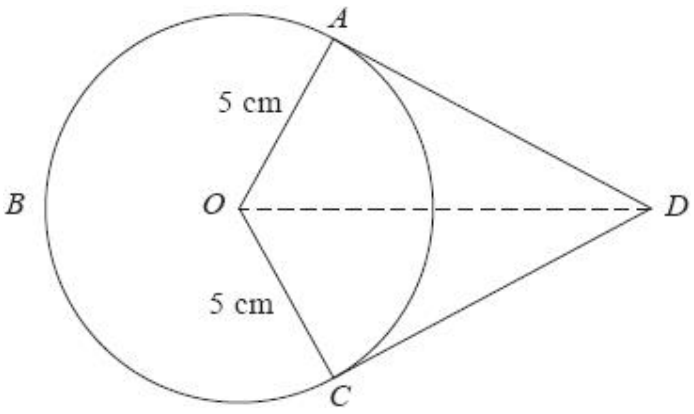
All measurements are in centimetres.
The perimeters of these two shapes are the same.

Work out the area of the rectangle.

..... cm^2

(Total for question = 5 marks)

Q46.



A, *B* and *C* are points on a circle of radius 5 cm, centre *O*.
DA and *DC* are tangents to the circle.
DO = 9 cm

Work out the length of arc *ABC*.
Give your answer correct to 3 significant figures.

..... cm

(Total for question = 5 marks)

Q47.

Here are the first five terms of an arithmetic sequence.

7 13 19 25 31

Prove that the difference between the squares of any two terms of the sequence is always a multiple of 24

(Total for question is 6 marks)

Q48.

(a) Show that the equation $x^3 - 3x^2 + 3 = 0$ has a solution between $x = 2$ and $x = 3$

(2)

(b) Show that the equation $x^3 - 3x^2 + 3 = 0$ can be rearranged to give $x = \sqrt[3]{3x^2 - 3}$

(1)

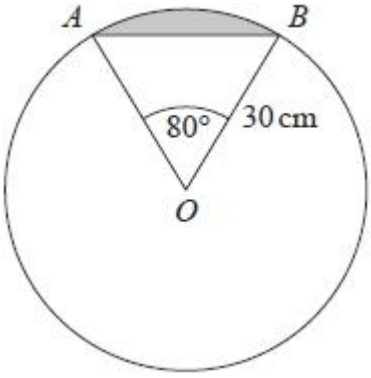
(c) Starting with $x_0 = 2$, use the iteration formula $x_{n+1} = \sqrt[3]{3x_n^{\ 2} - 3}$ to find the value of x_2
Give your answer correct to 3 decimal places.

.....

(3)

(Total for question = 6 marks)

Q49.



AB is a chord of a circle centre *O*.

The radius of the circle is 30 cm.
Angle *AOB* = 80°

Work out what percentage of the area of the circle is shaded.

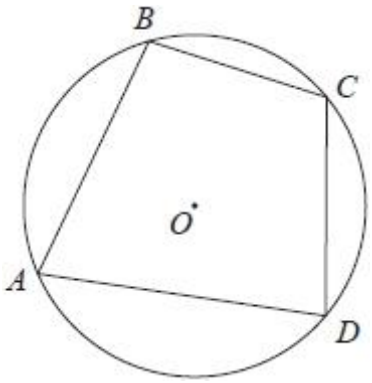
..... %

(Total for question = 5 marks)

Q50.

A, *B*, *C* and *D* are points on the circumference of a circle, centre *O*.

Prove that the sum of angle *ABC* and angle *ADC* is 180°



(Total for question = 4 marks)

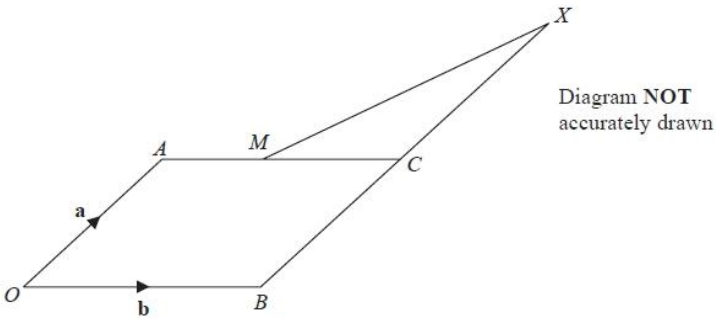
Q51.

OACB is a parallelogram.

M is the midpoint of *AC.*
C is the midpoint of the straight line *BCX*.

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

Prove that *OMX* is a straight line.



(Total for Question is 4 marks)

Q52.

The diagram shows triangle *ABC*.

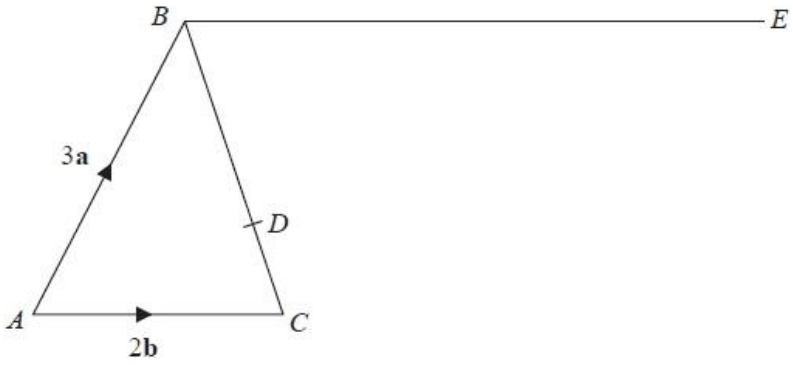
$\overrightarrow{AB} = 3\mathbf{a}$

$\overrightarrow{AC} = 2\mathbf{b}$

$\overrightarrow{BE} = 3\overrightarrow{AC}$

D is the point on *BC* such that *BD* : *DC* = 3 : 1

Prove that *ADE* is a straight line.



(Total for question = 4 marks)

Q53.

P has coordinates (–9, 7)
Q has coordinates (11, 12)

M is the point on the line segment *PQ* such that *PM* : *MQ* = 2 : 3

Line **L** is perpendicular to the line segment *PQ*.
L passes through *M*.

Find an equation of **L**.

.....

(Total for question = 5 marks)

Q54.

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**.

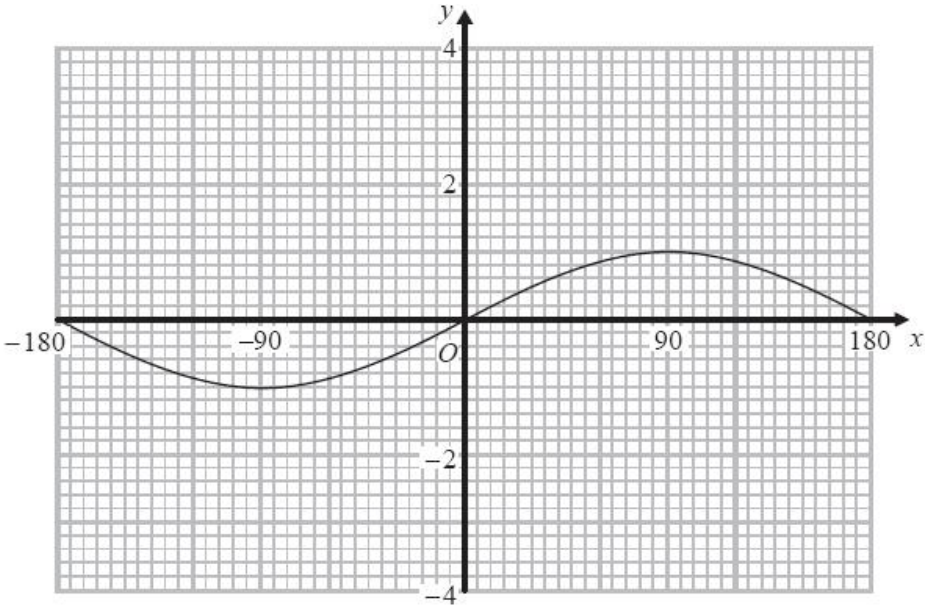
Label with coordinates
the centre of circle **B**
and any points of intersection with the x-axis.

(3)

(Total for question = 4 marks)

Q55.

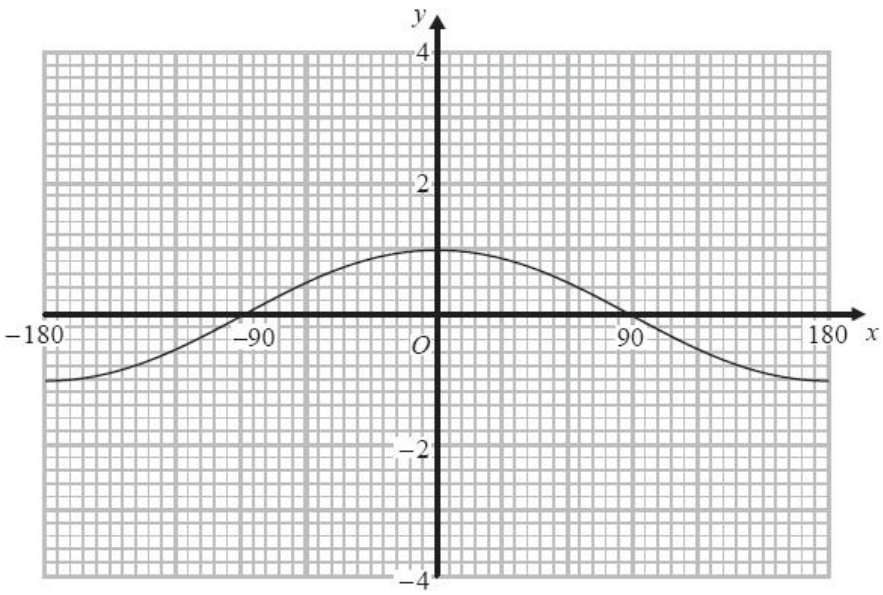
Here is the graph of $y = \sin x°$ for $-180 \leq x \leq 180$



(a) On the grid above, sketch the graph of $y = \sin x° + 2$ for $-180 \leq x \leq 180$

(2)

Here is the graph of $y = \cos x°$ for $-180 \leq x \leq 180$



(b) On the grid above, sketch the graph of $y = -2\cos x°$ for $-180 \leq x \leq 180$

(2)

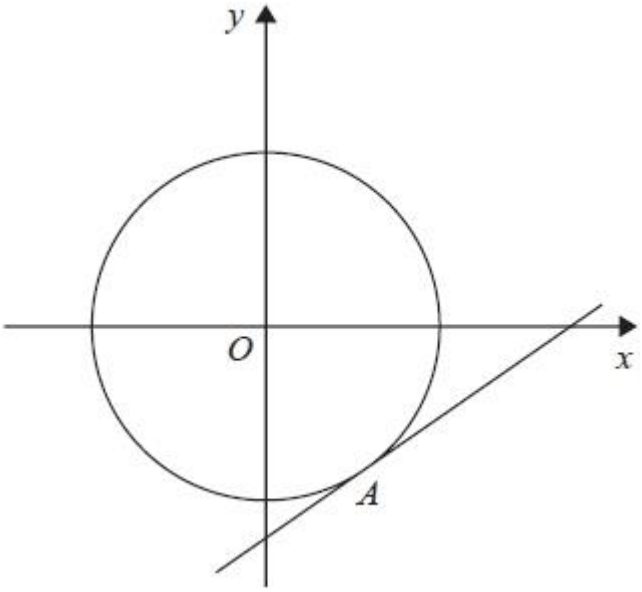
(Total for question = 4 marks)

Q56.

The diagram shows the circle with equation $x^2 + y^2 = 261$

A tangent to the circle is drawn at point A with coordinates $(p, -15)$, where $p > 0$

Find an equation of the tangent at A.



.....

(Total for question = 5 marks)

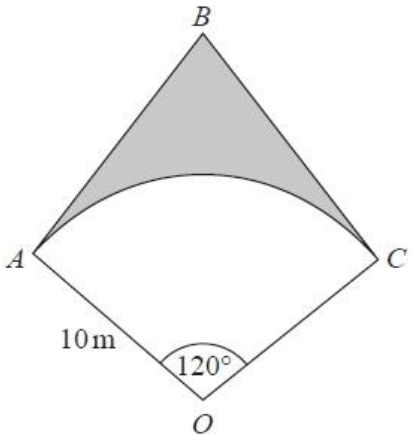
Q57.

OAC is a sector of a circle, centre *O*, radius 10 m.

BA is the tangent to the circle at point *A*. *BC* is the tangent to the circle at point *C*.

Angle *AOC* = 120°

Calculate the area of the shaded region. Give your answer correct to 3 significant figures.



..... m^2

(Total for question = 5 marks)