Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS (SYLLABUS D) **4024/11**

Paper 1 **October/November 2015**

2 hours

Candidates answer on the Question Paper.

Additional Materials: Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

If working is needed for any question it must be shown in the space below that question.
Omission of essential working will result in loss of marks.

ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 80.

ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER

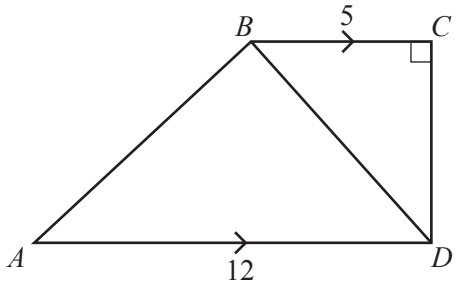
1 **(a)** Work out $12 + 6 \div 3 + 1 \times 5$.

Answer ..... [1]

(b) Work out $\frac{7}{9} - \frac{3}{5}$.

Answer ..... [1]

2



ABCD is a quadrilateral with *BC* parallel to *AD*.
CD is perpendicular to *BC*.
BC = 5 cm and *AD* = 12 cm.
The area of triangle *BCD* is 20 cm^2.

(a) Find *CD*.

Answer ..... cm [1]

(b) Find the area of triangle *ABD* .

Answer ..... cm^2 [1]

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3 A number written as the product of its prime factors is $2^2 \times 5^2 \times 7$.

(a) Evaluate this number.

Answer ..... [1]

(b) The lowest common multiple of $2^2 \times 5^2 \times 7$ and another number, N, is $2^2 \times 3 \times 5^2 \times 7^2$.

Find the lowest possible value of N.

Answer $N =$ ..... [1]

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4 The exchange rate between pounds (£) and dollars ($) is £1 = $1.60 .

(a) Amit changes £200 to dollars.

Calculate the number of dollars he receives.

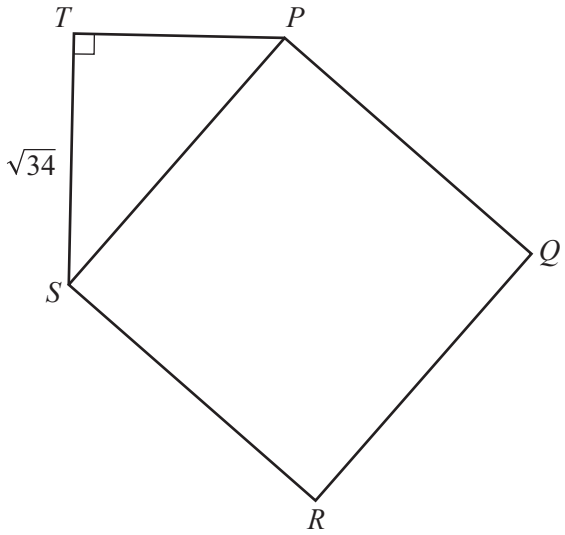
Answer $..... [1]

(b) Ayesha changes $240 to pounds.

Calculate the number of pounds she receives.

Answer £..... [1]

5



The diagram shows a square $PQRS$ and a right-angled triangle PST.
The area of the square is $50\,\text{cm}^2$.
$ST = \sqrt{34}$ cm.

Calculate PT.

Answer ..... cm [2]

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6 **(a)** Write 30 682 correct to three significant figures.

Answer ..... [1]

(b) Given that $538 \times 210 = 112\,980$, evaluate $112.98 \div 210$.

Answer ..... [1]

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7 Paul takes examinations in Maths and Physics.
The probability that he passes Maths is 0.7 .
The probability that he passes Physics is 0.6 .
The results in each subject are independent of each other.

Calculate the probability that he passes Maths and does **not** pass Physics.

Answer ..... [2]

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8 **(a)** $\cos y^\circ = -0.54$ where $90 < y < 180$

One solution of the equation $\cos x^\circ = 0.54$ is $x = 57$, correct to the nearest whole number.

Find y correct to the nearest whole number.

Answer $y =$ ..... [1]

(b) Solve $\frac{5a - 2}{3} = 11$.

Answer $a =$ ..... [2]

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9 **(a)**

p	27	33
q	9	r

Given that p is directly proportional to q, find the value of r.

Answer $r =$ ..... [1]

(b)

x	2	10
y	25	1

Complete the sentence below describing the relationship between x and y.

y is inversely proportional to ..... [1]

(c) M is directly proportional to L^3.

How many times larger is M when L is multiplied by 2?

Answer ..... [1]

10 Here is a list of numbers.

$$-8 \quad -5 \quad -3 \quad -2 \quad 0 \quad 2 \quad 4 \quad 9$$

(a) Write down two numbers from the list that have a difference of 10.

Answer ..... and ..... [1]

(b) Find the sum of the numbers in the list.

Answer ..... [1]

(c) It is given that $-4 \leqslant 2x \leqslant 7$.

Write down all the numbers from the list which satisfy this inequality.

Answer ..... [1]

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11 An empty box has a mass of 0.8 kg correct to the nearest 0.1 kg.

(a) Write down the lower bound for the mass of the empty box.

Answer ..... kg [1]

(b) The box is filled with books.
The total mass of the box and the books is 6 kg correct to the nearest kilogram.

Work out the lower bound for the mass of the books.

Answer ..... kg [2]

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12 A group of five numbers has a mean of 3.8 and a median of 3. The numbers 3 and 6 are added to the group.

(a) Find the mean of the seven numbers.

Answer ..... [2]

(b) Find the median of the seven numbers.

Answer ..... [1]

13 Each member of a group of 50 people was asked how many films they watched in a month. The results are shown in the table below.

Numbers of films watched	Frequency
0	5
1	12
2	13
3	15
4	4
5	1

(a) Find the mode.

Answer ..... [1]

(b) Calculate the mean number of films watched in a month.

Answer ..... [2]

14 **(a)** Evaluate $9^{-\frac{1}{2}}$.

Answer ..... [1]

(b) Evaluate $10^3 - 10^0$.

Answer ..... [1]

(c) Solve $x^{\frac{3}{2}} = 8$.

Answer $x =$ ..... [1]

15

$$4 = \sqrt{\frac{cx+1}{dx-1}}$$

Find x in terms of c and d.

Answer $x =$ ..... [3]

---

16 **(a)** The mass of a dust particle is approximately $0.000\,075\,3$ g.

Write this mass in standard form.

Answer ..... g [1]

(b) The mass of the Earth is 5.972×10^{24} kg.
The mass of the Moon is 7.3×10^{22} kg.

Find the total mass, in kg, of the Earth and the Moon.
Give your answer in standard form.

Answer ..... kg [2]

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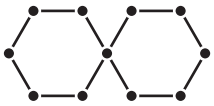
17 $\mathrm{f}(x) = 5 + x^2$

Find t given that $\mathrm{f}(3 - t) = 9$.

Answer $t =$ ..... or ..... [3]

18 A sequence of patterns is made using dots and lines.

Pattern 1



Pattern 2

Pattern 3

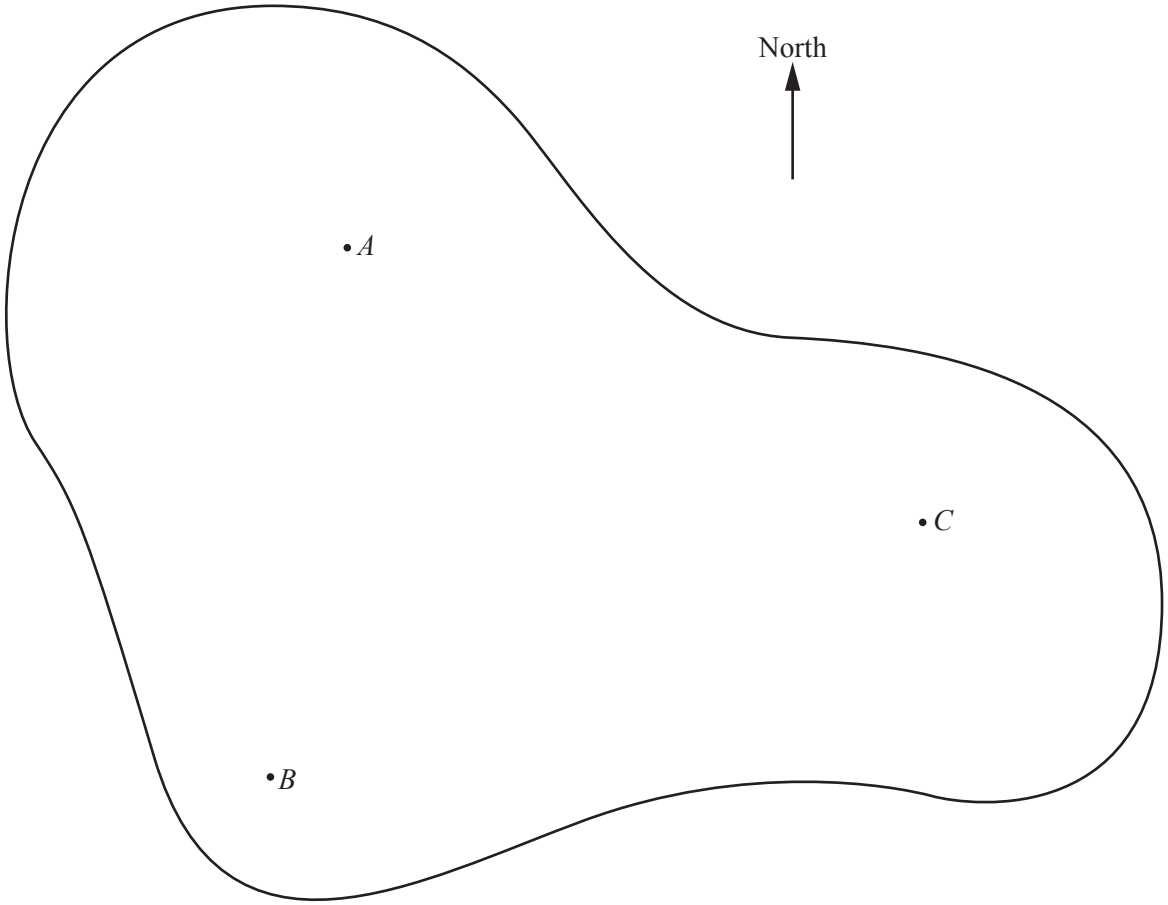
Pattern number (p)	1	2	3	4
Number of dots (d)	6	11	16	

(a) Complete the table for Pattern 4. [1]

(b) Find a formula for the number of dots, d, in Pattern p.

Answer $d =$ ..... [2]

19



The land region shown has wheat storage depots at A, B and C.

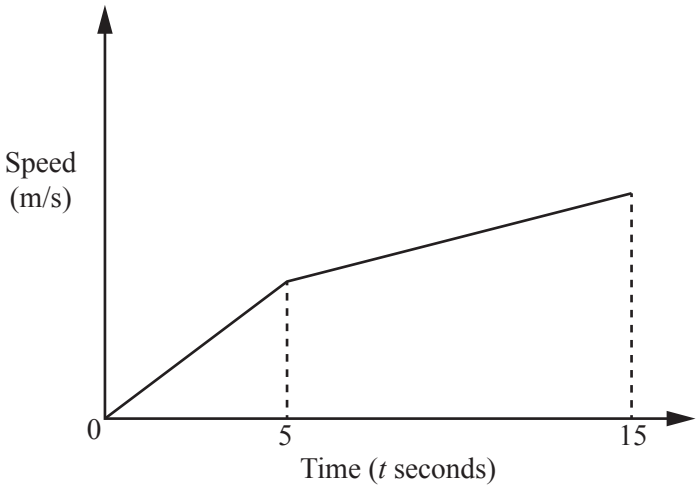
(a) Given that the bearing of C from A is 115°, find the bearing of A from C.

Answer ..... [1]

(b) Local farmers take their wheat to the nearest depot.

By drawing suitable accurate constructions, find and shade the region which is served by the depot at B. [2]

20



The diagram shows the first 15 seconds of a car's journey.
The car starts from rest.
The acceleration of the car from $t = 0$ to $t = 5$ is $4\,m/s^2$.
The acceleration of the car from $t = 5$ to $t = 15$ is $2\,m/s^2$.

(a) Find the speed of the car when

(i) $t = 5$,

Answer ..... m/s [1]

(ii) $t = 15$.

Answer ..... m/s [1]

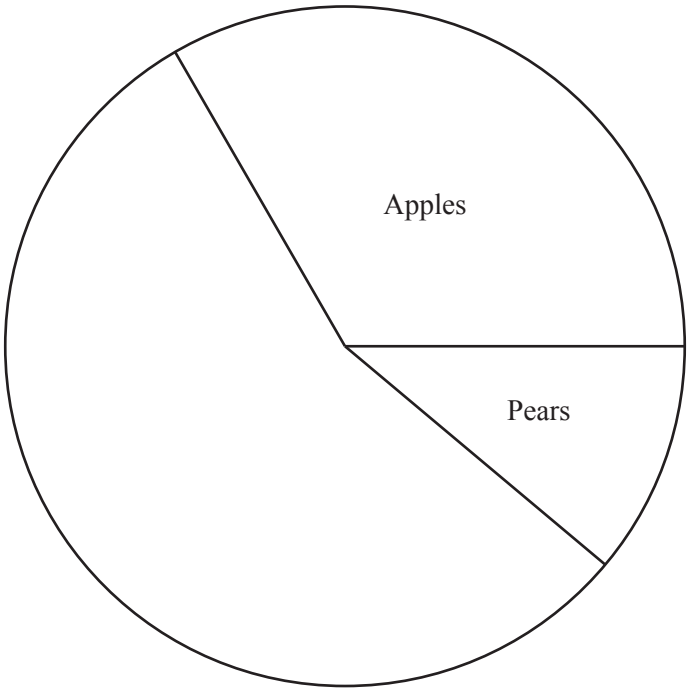
(b) Find the distance travelled by the car between $t = 5$ and $t = 15$.

Answer ..... m [2]

21 The table shows the masses of different fruits sold at a market stall on one day.

Fruit	Apples	Pears	Oranges	Bananas	Total
Mass (kg)	30	10	18	32	90

(a) Complete the pie chart to illustrate the data.



[2]

(b) The stallholder buys apples for 60 cents per kilogram.
She sells them all for 72 cents per kilogram.

Calculate her percentage profit.

Answer .....% [2]

22 **(a)** Expand and simplify $10 - 3(3x - 2)$.

Answer ..... [1]

(b) Simplify fully $\dfrac{3x^2 + 16x + 5}{9x^2 - 1}$.

Answer ..... [3]

23 A group of 15 adults and 12 children are going on a coach to a concert.
The tickets for the coach cost $\$a$ for each adult and $\$c$ for each child.
The total cost for the coach tickets is \$324.

(a) Show that $5a + 4c = 108$.

[1]

(b) For a different group of 2 adults and 3 children the cost is \$53.

Solve the simultaneous equations.

$$5a + 4c = 108$$
$$2a + 3c = 53$$

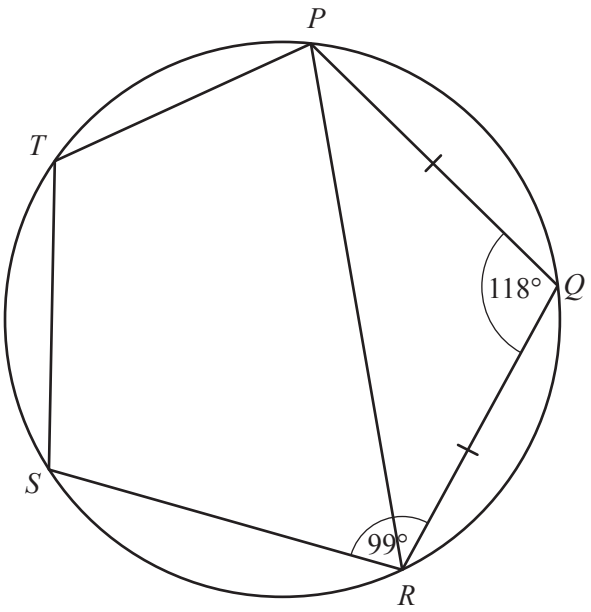
Answer $a =$ .....

$c =$ ..... [4]

(c) Find the cost for a group of 4 adults and 5 children to travel on the coach.

Answer \$..... [1]

24 (a)

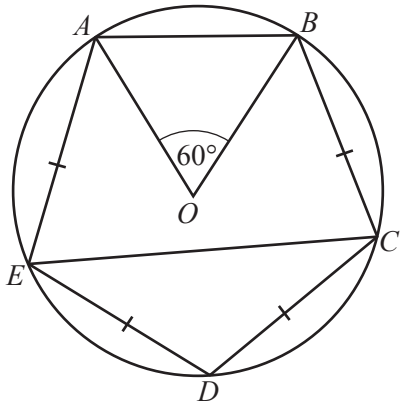


P, Q, R, S and T are points on the circumference of a circle.
$PQ = QR$.
$P\hat{Q}R = 118°$ and $Q\hat{R}S = 99°$.

Find $P\hat{T}S$.
Show all your working.

Answer $P\hat{T}S =$ ..... [2]

(b)



A, B, C, D and E are points on the circumference of a circle, centre O.
$AE = ED = DC = CB$ and $A\hat{O}B = 60°$.

(i) Find $E\hat{C}D$.
Show all your working.

Answer $E\hat{C}D =$ ..... [2]

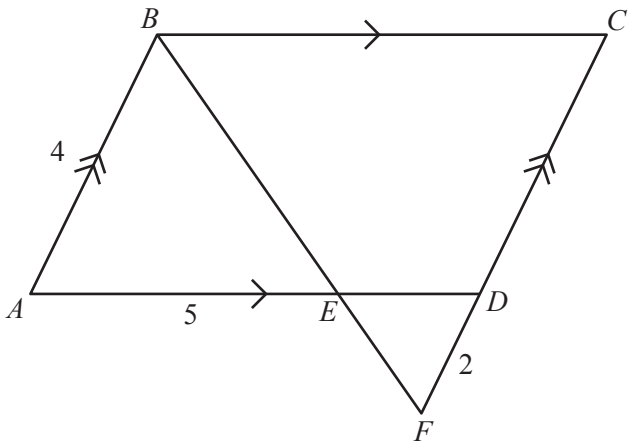
(ii) The radius of the circle is 12 cm.

Calculate the length of the minor arc AB.
Use $\pi = 3.14$.

Answer ..... cm [2]

Question 25 is printed on the next page

25



ABCD is a parallelogram.
BEF and *CDF* are straight lines.
AB = 4 cm, *DF* = 2 cm and *AE* = 5 cm.

(a) Show that triangles *ABE* and *CFB* are similar.
Give reasons for each of your statements.

[2]

(b) Calculate *BC*.

Answer ..... cm [2]

(c) Triangle *DFE* is also similar to triangle *ABE*.
Given that the area of triangle *DFE* is x cm^2, find the area of *ABCD* in terms of x.

Answer ..... cm^2 [2]