UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

9567582365

MATHEMATICS (SYLLABUS D) **4024/12**

Paper 1 **May/June 2012**

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, highlighters, 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.

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For Examiner's Use

1 **(a)** Express 72% as a fraction in its lowest terms.

Answer ..... [1]

(b) Write down **two** fractions that are equivalent to 0.4 .

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

---

2 The temperature in a freezer is –18 °C.
The outside temperature is 24 °C.

(a) Find the difference between the outside temperature and the freezer temperature.

Answer .....°C [1]

(b) The temperature in a fridge is 22 °C warmer than the freezer temperature.

Find the temperature in the fridge.

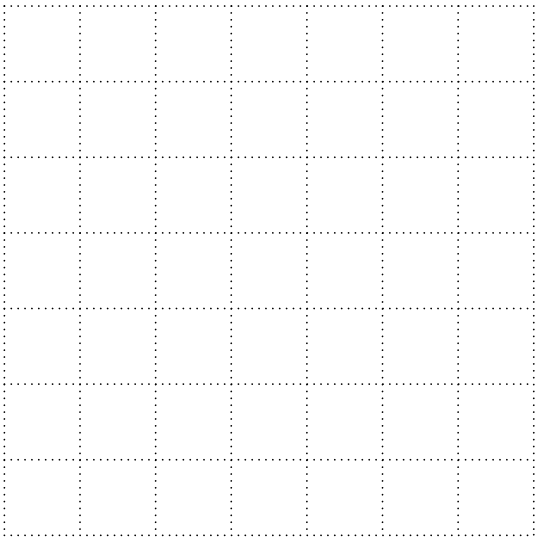
Answer .....°C [1]

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3 **(a)** On the grid below, draw a quadrilateral with

no rotational symmetry
and just 1 line of symmetry.



[1]

(b) Complete this description.

A parallelogram has rotational symmetry of order .....

and ..... lines of symmetry. [1]

---

4 **(a)** A bag contains red and blue counters in the ratio 3 : 8.
There are 24 blue counters in the bag.

How many red counters are there?

Answer .....[1]

(b) Amy and Ben share $360 in the ratio 3 : 2.

How much is Ben's share?

Answer $.....[1]

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5 y is inversely proportional to the square of x.

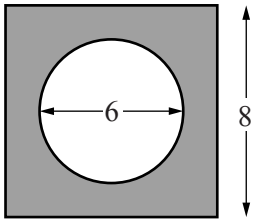
Given that $y = 2$ when $x = 6$, find the value of y when $x = 2$.

Answer $y =$ ..... [2]

---

6 A circle of diameter 6 cm is cut from a square of side 8 cm.

Find an expression, in the form $a - b\pi$, for the shaded area.



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

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7 **(a)** Solve $\frac{x+2}{3} \leqslant 2$.

Answer ..... [1]

(b) Write down all the integers that satisfy this inequality.

$$-1 \leqslant 4y + 3 < 11$$

Answer ..... [1]

---

8 The length of a rectangular rug is given as 0.9 m, correct to the nearest ten centimetres. The width of the rug is given as 0.6 m, correct to the nearest ten centimetres.

(a) Write down the upper bound, in metres, of the length of the rug.

Answer ..... m [1]

(b) Find the lower bound, in metres, of the perimeter of the rug.

Answer ..... m [1]

For Examiner's Use

9 **(a)** Evaluate $\frac{2}{5} + \frac{3}{8}$.

Answer .....[1]

(b) Evaluate $1\frac{2}{3} \times 2\frac{1}{4}$, giving your answer as a mixed number in its lowest terms.

Answer .....[2]

---

10 **(a)** Evaluate $6 \times 3 + 8 \div 2$.

Answer .....[1]

(b) By writing each number correct to 1 significant figure, estimate the value of

$$\frac{19.2 \times 9.09}{0.583}.$$

Answer .....[2]

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11 $c = \dfrac{b(a-b)}{a}$

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(a) Find c when $a = 4$ and $b = -2$.

Answer $c =$ ..... [1]

(b) Rearrange the formula to make a the subject.

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

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12 $\mathbf{m} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$ $\mathbf{n} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$

(a) Calculate $\mathbf{m} - 2\mathbf{n}$.

Answer $\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

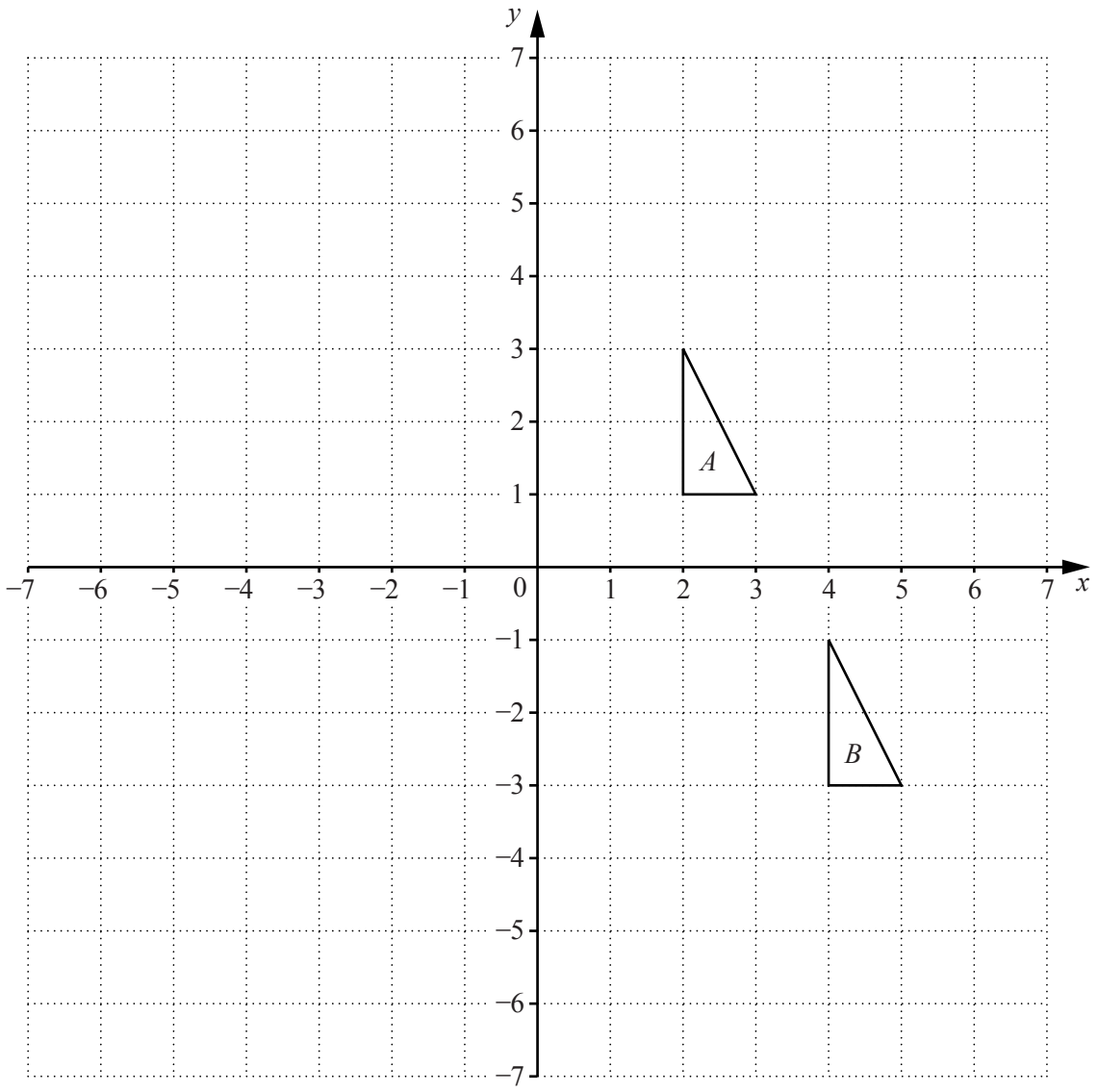
(b) Given that $s\mathbf{m} + 3\mathbf{n} = \begin{pmatrix} 12 \\ t \end{pmatrix}$, calculate s and t .

Answer $s =$ .....

$t =$ ..... [2]

13 The diagram shows two triangles, A and B.

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(a) Write down the vector that represents the translation that maps triangle A onto triangle B.

Answer [1]

(b) Triangle C is an enlargement of triangle A with centre (5, 3) and scale factor 3.

Draw and label triangle C. [2]

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14 A is the point (0, 4) and B is the point (–6, 1).

(a) M is the midpoint of the line AB.

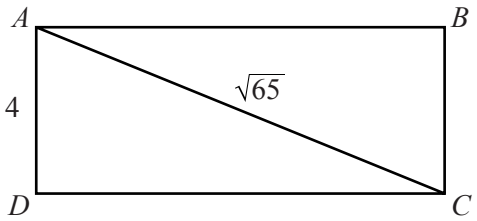
Find the coordinates of M.

Answer (....., ...) [1]

(b) Find the equation of the line AB.

Answer ..... [2]

15



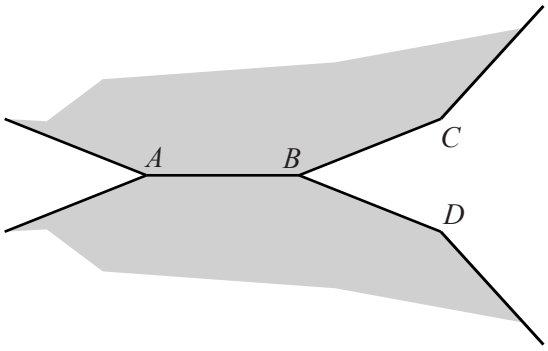
$ABCD$ is a rectangle with $AC = \sqrt{65}$ cm and $AD = 4$ cm.

Calculate the area of $ABCD$.

Answer .....cm^2 [3]

16

For Examiner's Use



The diagram shows parts of two identical regular 12-sided polygons.

(a) Calculate angle *ABC*.

Answer ..... [2]

(b) A different regular shape will fit exactly into the space at *B*.

Name this shape.

Answer ..... [1]

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17 **(a)** A carton contains 2.5 litres of juice.
Carlos drinks 650 ml of the juice.

How much juice is left in the carton?
Give your answer in litres.

Answer ..... litres [1]

(b) The time in Chennai is $4\frac{1}{2}$ hours ahead of the time in London.

(i) What time is it in London when it is 14 45 in Chennai?

Answer .....[1]

(ii) A flight leaves London at 13 25 local time.
It arrives in Chennai at 04 00 local time the next day.

Work out, in hours and minutes, the length of the flight.

Answer ..... hours ..... minutes [2]

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18 **(a)** Find the value of

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(i) $\sqrt{121}$,

Answer .....[1]

(ii) $\sqrt[3]{-27}$.

Answer .....[1]

(b) Write the following numbers in order of size, starting with the smallest.

2^3 3^2 4^0 5^{-1}

Answer ....[1]
smallest

(c) Evaluate $16^{\frac{3}{2}}$.

Answer .....[1]

19 **(a)** $f(x) = x^3 - 4$

For Examiner's Use

Find

(i) f(–2),

Answer f(–2) = ... [1]

(ii) $f^{-1}(x)$.

Answer $f^{-1}(x)$ = ... [1]

(b) $g(y) = y^2 - 3y + 1$

Write down and simplify an expression for $g(a - 2)$.

Answer $g(a - 2)$ = ... [2]

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20 The table below shows the populations of some countries in 2010.

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Country	Population
Indonesia	2.4×10^8
Mexico	
Russia	1.4×10^8
Senegal	1.4×10^7
South Korea	4.8×10^7

(a) The population of Mexico was 111 210 000.

In the table above, complete the row for Mexico.
Give your answer in standard form, correct to two significant figures. [1]

(b) Complete the following sentences.

The population of Russia is ten times the population of .....

The population of ..... is one fifth of the population of Indonesia. [2]

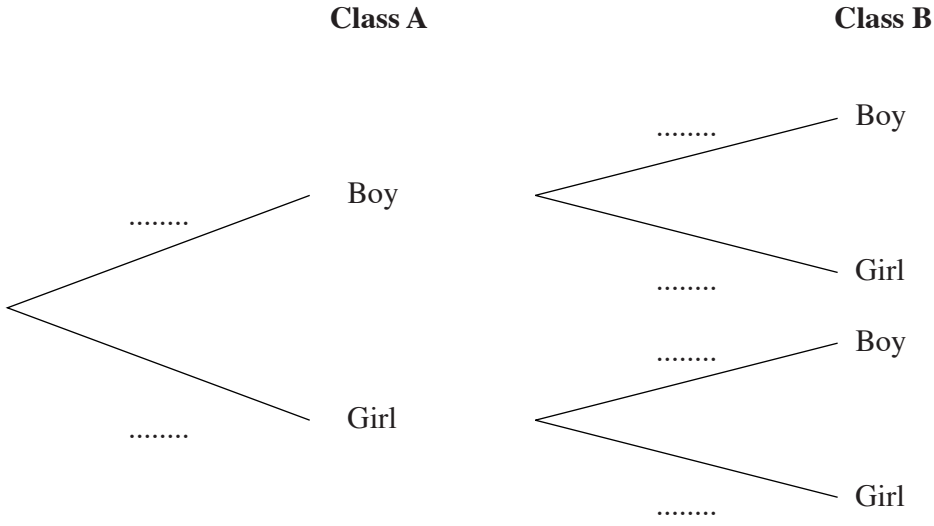
(c) Calculate the difference in population between South Korea and Senegal.
Give your answer in standard form.

Answer ..... [1]

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21 In class A there are 10 boys and 15 girls.
In class B there are 20 boys and 10 girls.
One student is picked from each class at random.

(a) Complete the tree diagram to show the probabilities of the possible outcomes.



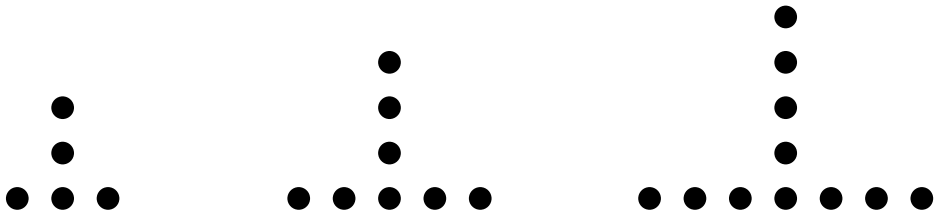
[2]

(b) Find the probability that one student is a boy and one is a girl.
Express your answer as a fraction in its lowest terms.

Answer ..... [2]

22 The diagrams below show the first three patterns in a sequence.

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Pattern 1 Pattern 2 Pattern 3

(a) Complete the table.

Pattern number	1	2	3	4	5
Number of dots	5	8			

[1]

(b) Find an expression, in terms of n, for the number of dots in Pattern n.

Answer .....[1]

(c) In this sequence, Pattern p has 83 dots.

Find the value of p.

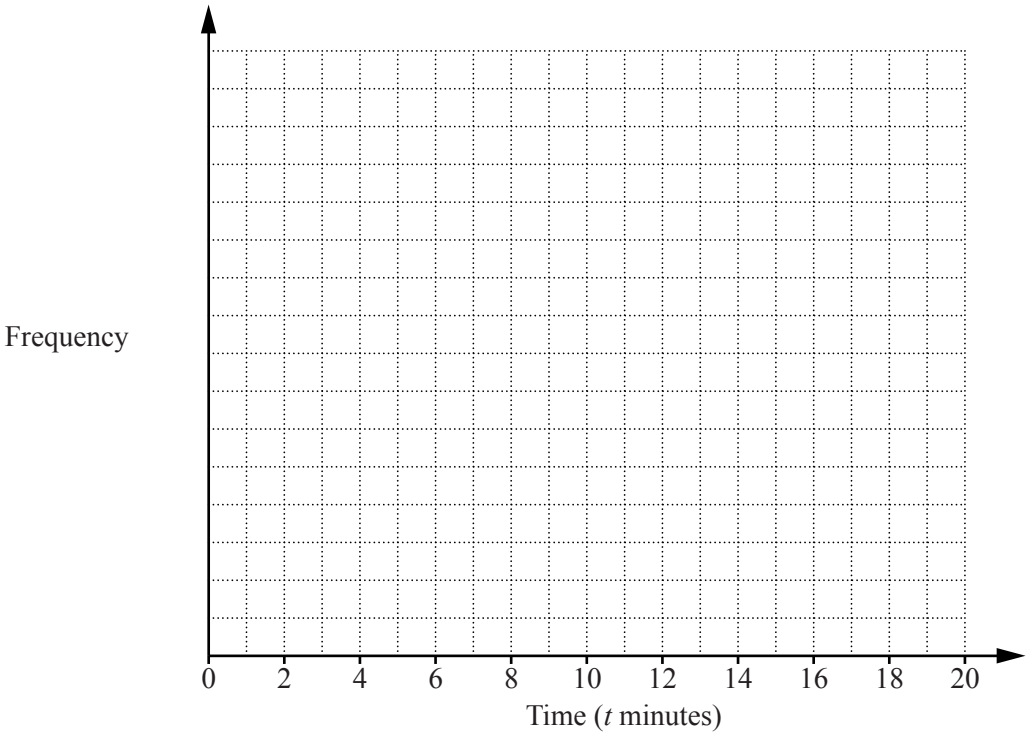
Answer $p =$ .....[2]

23 The table summarises the times, in minutes, taken by a group of people to complete a puzzle.

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Time (t minutes)	$0 < t \leqslant 4$	$4 < t \leqslant 8$	$8 < t \leqslant 12$	$12 < t \leqslant 16$	$16 < t \leqslant 20$
Frequency	4	8	7	4	2

(a) On the grid draw a frequency polygon to represent this information.



[2]

(b) Write down the modal class.

Answer ..... [1]

(c) How many people took more than 8 minutes to complete the puzzle?

Answer ..... [1]

(d) Imran says:

'The longest time to complete the puzzle was 20 minutes.'

Explain why he may not be correct.

.....

..... [1]

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24 **(a)** The price of a television is $350.
In a sale, its price is reduced by 30%.

Calculate the sale price of the television.

Answer $..... [1]

(b) The exchange rate between dollars and euros is $1 = €0.80$.
Ben changes $275 into euros.

Calculate the number of euros Ben receives.

Answer €..... [1]

(c) Aisha buys a new car.

Cash price
$4500

Credit terms
Deposit: 25% of cash price
+
12 monthly payments of $320

She buys the car using the credit terms.

How much **more** than the cash price will she pay overall for the car?

Answer $..... [3]

Question 25 is printed on the following page.

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25 **(a)** Factorise

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(i) $x^2 + x - 12$,

Answer ..... [1]

(ii) $25x^2 - 4y^2$.

Answer ..... [1]

(b) Write as a single fraction $\frac{4}{3p} + \frac{1}{6p}$.

Answer ..... [1]

(c) Solve the simultaneous equations.

$$3x + 5y = 2$$
$$2x - 3y = 14$$

Answer $x =$ .....

$y =$ ..... [3]

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