O

MINISTRY OF EDUCATION, SINGAPORE
in collaboration with
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER S

INDEX NUMBER

MATHEMATICS

Paper 1

4016/01

October/November 2014

2 hours

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, index number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB 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 with the answer.
Omission of essential working will result in loss of marks.
The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

At the end of the examination, fasten all your work securely together.
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.

For Examiner's Use

This document consists of **15** printed pages and **1** blank page.

Singapore Examinations and Assessment Board

CAMBRIDGE
International Examinations

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DC (NH/SW) 73016/5

[Turn over

Oct/Nov 2014 Paper 1 (1)

Answer **all** the questions.

1   Write the following in order of size, smallest first.

$$\frac{27}{38} \qquad \sqrt{0.49} \qquad 0.61^{\frac{2}{3}} \qquad 0.702$$

Answer .... , ... , ... , ... [2]
smallest   largest

2   Hasim is travelling from Singapore to Switzerland.
    In Singapore, the exchange rate is 1 Singapore Dollar = 0.765 Swiss Francs.
    In Switzerland, the exchange rate is 1 Swiss Franc = 1.294 Singapore Dollars.

    Hasim wants to change 500 Singapore Dollars into Swiss Francs.

    How many more Swiss Francs will he get by changing his money in Switzerland?

Answer .... Swiss Francs [2]

3   (a)   Calculate $\dfrac{13.5^3}{6.48 - 2.57}$.

       Write down the first five digits of your answer.

Answer (a) .... [1]

    (b)   Write your answer to **part (a)** correct to 2 significant figures.

Answer (b) .... [1]

4   The sine of an angle is 0.7420.

    Give two possible values for the angle.

Answer .... or .... [2]

Oct/Nov 2014 Paper 1 (2)

5　Alyssa wants to find out how much time students spend on the Internet.
　She uses this question on a questionnaire.

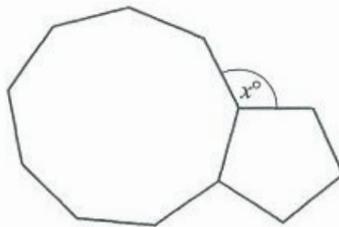> How many hours do you spend on the Internet?
> Tick one box.
>
> ☐　　☐　　☐　　☐
> 1 – 2　　3 – 4　　5 – 7　　over 7

List **two** things wrong with this question.

Answer　1. ....

　　　　2. .... [2]

6　Given that $4 \times 64^n = 1$, find the value of n.

Answer $n =$ .... [2]

7

The diagram shows a sketch of a regular pentagon and a regular nonagon (nine-sided polygon).

Calculate x.

Answer $x =$ .... [2]

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Oct/Nov 2014 Paper 1 (3)

8 Two bottles are geometrically similar.
The smaller bottle has a capacity of 1 litre and the larger bottle has a capacity of 2 litres.

Calculate the height of the smaller bottle as a percentage of the height of the larger bottle.

Answer ....% [2]

9 Some bacteria were introduced into a culture.
The number, B, of bacteria t hours after being introduced is given by
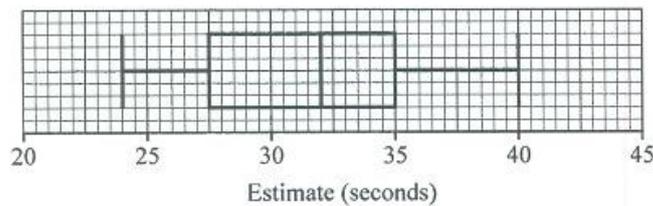
$$B = 1000 \times 3^t .$$

(a) How many bacteria were introduced into the culture?

Answer (a) .... [1]

(b) Find the percentage increase in the number of bacteria at the end of the first hour.

Answer (b) ....% [1]

10 A group of students was asked to estimate a time interval of 30 seconds.
The results are represented in the box-and-whisker plot.

20   25   30   35   40   45
                    Estimate (seconds)

(a) Find the median of the estimates.

Answer (a) ....seconds [1]

(b) Find the interquartile range of the estimates.

Answer (b) ....seconds [1]

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Oct/Nov 2014 Paper 1 (4)
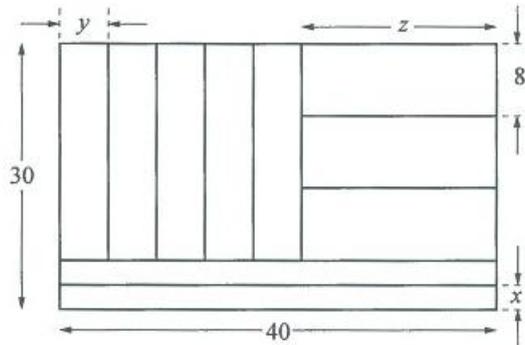
11   The cash price of a washing machine is $980.
     The hire-purchase price of the washing machine is $1089.
     The hire-purchase price is a deposit of 15% of the cash price plus 12 equal monthly payments.

     Calculate one monthly payment.

                                        Answer $ .... [3]

12   A rectangle measures 40 cm by 30 cm.
     It is divided into ten rectangles of **equal area** as shown.

     Find the lengths labelled x, y and z.

                                        Answer $x =$ .... cm

                                               $y =$ .... cm

                                               $z =$ .... cm [3]

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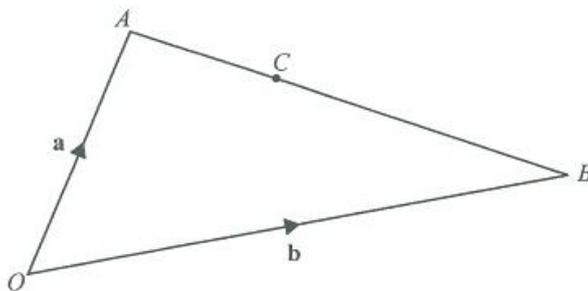   **Oct/Nov 2014 Paper 1 (5)**

13 Nur invested some money in a savings account for 3 years.
    The rate of compound interest was fixed at 4% per annum.
    At the end of the 3 years there was $8436.48 in her account.

    How much did Nur invest in the account?

    Answer $ .... [3]

---

14 *OAB* is a triangle.
    C is the point on *AB* such that $AC = \frac{1}{3}AB$.
    $\overrightarrow{OA} = $ **a** and $\overrightarrow{OB} = $ **b**.

    (a) Find $\overrightarrow{AC}$ in terms of **a** and **b**.

    Answer (a) $\overrightarrow{AC} = $ .... [1]

    (b) *D* is the point on *OB* such that *OD* : *DB* = 1 : 3.

        Use vectors to show that *OA* and *DC* are **not** parallel.

        Answer (b)

                                                                        [2]

Oct/Nov 2014 Paper 1 (6)

15 $\mathscr{E} = \{\text{integers } x : 4 \leqslant x \leqslant 11\}$
    $A = \{\text{factors of } 10\}$
    $B = \{\text{prime numbers}\}$

(a) Draw a Venn diagram to illustrate this information.

Answer (a)

[2]

(b) List the elements contained in the set $(A \cap B)'$.

Answer (b) .... [1]

16 Simplify

(a) $36a^2b^3 \div 24a^3b^{-2}$,

Answer (a) .... [2]

(b) $\dfrac{1}{x-5} + \dfrac{7x}{(x-5)^2}$.

Answer (b) .... [2]

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Oct/Nov 2014 Paper 1 (7)

17 Each term in this sequence is found by adding the same number to the previous term.

$$a, \quad 12, \quad b, \quad c, \quad 33, \quad \ldots$$

(a) Find the values of a, b, and c.

Answer (a) a = ...

b = ...

c = ... [2]

(b) Write down an expression, in terms of n, for the nth term.

Answer (b) .... [1]

(c) Explain why 109 is not a term of this sequence.

Answer (c) ....

.... [1]

18 A train 220 m long passes through a tunnel 4.8 km long.
The average speed of the train is 31 km/h.

(a) Change 31 km/h into m/s.

Answer (a) ....m/s [1]

(b) Calculate the time taken for the train to pass completely through the tunnel.
Give your answer in minutes and seconds, to the nearest second.

Answer (b) .... minutes .... seconds [3]

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Oct/Nov 2014 Paper 1 (8)

19 An object starts from rest and travels in a straight line.
The distance travelled, s metres, is directly proportional to the square of the travelling time, t seconds.

(a) Sketch a distance–time graph for the object.

Answer (a)
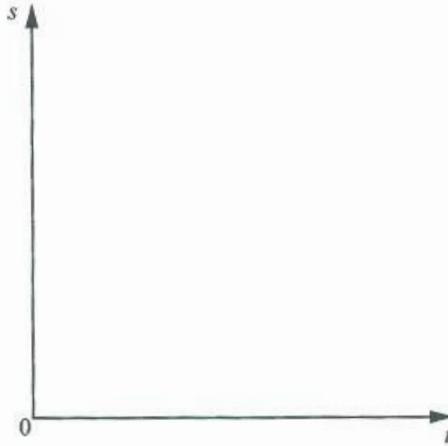
[1]

In the first 4 seconds the object travels 36 m.

(b) Find the equation for s in terms of t.

Answer (b) $s =$ .... [2]

(c) Calculate the time taken to travel 20 m.

Answer (c) ....seconds [1]

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Oct/Nov 2014 Paper 1 (9)

20 The diagram shows a spinner with eight numbered sectors.

Each time the pointer is spun it is equally likely to stop on any of the sectors.

(a) The pointer is spun once.

Find the probability that it stops on an even number.

Answer (a) .... [1]

(b) Anil spins the pointer twice.

Find the probability that the pointer stops on an even number both times.

Answer (b) .... [1]

(c) Rin spins the pointer twice.
Her score is found by adding the numbers from her two spins.

Find the probability that her score is **not** 2.

Answer (c) .... [2]

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Oct/Nov 2014 Paper 1 (10)

21 Lin and Hadi save 10 cent, 20 cent and $1 coins.
    The number of coins they saved last month is given by the matrix **C**.

$$\begin{array}{ccc} 10¢ & 20¢ & \$1 \end{array}$$
$$C = \begin{pmatrix} 29 & 10 & 5 \\ 30 & 6 & 8 \end{pmatrix} \begin{array}{l} \text{Lin} \\ \text{Hadi} \end{array}$$

(a) (i) A 10¢ coin has a mass of 2.6 grams.
          A 20¢ coin has a mass of 4.5 grams.
          A $1 coin has a mass of 6.3 grams.

          Represent these masses in a 3 × 1 column matrix **D**.

          Answer (a)(i) **D** =   [1]

    (ii) Evaluate the matrix **E = CD**.

          Answer (a)(ii) **E** =   [2]

    (iii) State what the elements of **E** represent.

          Answer (a)(iii) ....

          .... [1]

(b) The elements of the matrix **V**, where **V = CF**, represent the values, in cents, of the coins saved
     last month by Lin and Hadi.

     Write down the matrix **F**.

          Answer (b) **F** =   [1]

Oct/Nov 2014 Paper 1 (11)

22 The cross-section of a gold pendant is a quadrilateral with two right angles and a circular hole, as shown. All measurements are in centimetres.

The diameter of the circular hole is 0.8 cm.
The uniform thickness of the pendant is 0.3 cm.
The mass of 1 cubic centimetre of gold is 19.3 grams.
The price of 1 gram of the gold is $69.65.

Calculate the value of the gold in the pendant.
Give your answer to the nearest cent.

Answer $.. [5]

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Oct/Nov 2014 Paper 1 (12)

23 Ravi is playing with 385 one-centimetre cubes.

(a) He uses some of the cubes to make a cuboid measuring 9 cm by 8 cm by 5 cm.

Calculate the total surface area of the cuboid.

Answer (a) .... cm^2 [2]

(b) Ravi uses all 385 cubes to make a cuboid.
All of the sides of the cuboid are longer than 1 cm.

Find the dimensions of the cuboid.

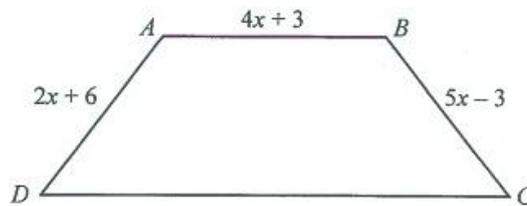*Answer (b)* ....cm by ....cm by ....cm [2]

(c) Ravi makes the largest cube possible using some of the 385 cubes.

How many cubes does he have left over?

Answer (c) .... [2]

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24 Expressions for the lengths of three sides of a trapezium are shown on the diagram below.
All lengths are in centimetres.

(a) The perimeter of this trapezium is given by the expression $(20x - 3)$ cm.

Find an expression, in terms of x, for the length of DC.
Give your expression in its simplest form.

Answer (a) ....cm [2]

(b) Given that $AD = BC$, calculate the perimeter of the trapezium.

Answer (b) ....cm [2]

(c) The perpendicular from A to DC meets DC at X.
The perpendicular from B to DC meets DC at Y.
$DX = CY$.

Calculate the area of the trapezium.

Answer (c) ....cm² [5]

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