Cambridge Assessment International Education

O LEVEL 4024

MATHEMATICS

Topical Paper 1

June 2023 – June 201*

Question arranged New to Old

All Variants | Mark Scheme

®STUDENTS RESOURCE

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Prepared By:	Jawad Saeed SJ | Asad Afzaal 03018474847 03214525452
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------Content------

1. Number

2023

1   4024/11/M/J/23/Q1

Work out.

(a) $1234.4 \div 8$

.... [1]

(b) $\frac{3}{7}$ of 56

.... [1]

2   4024/11/M/J/23/Q2

(a)   Write down the fraction of this 3×3 square that is shaded.
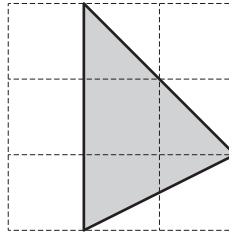
.... [1]

(b)   Evaluate 0.5^2.

.... [1]

3   4024/11/M/J/23/Q5

(a)   Insert one set of brackets to make the calculation correct.

$$3 \;+\; 5 \;\times\; 2 \;-\; 7 \;=\; 9$$ [1]

(b)   Insert $+$, $-$ and $\times$ to make the calculation correct.

$$3 \quad 5 \quad 2 \quad 7 \;=\; 20$$ [1]

4   4024/11/M/J/23/Q10

(a)   Work out $1\frac{1}{3} \times \frac{8}{9}$.

Give your answer as a mixed number in its simplest form.

.... [2]

(b) Kate has a bunch of grapes.

She ate $\frac{1}{4}$ of the grapes in the morning.

She ate $\frac{2}{3}$ of the grapes in the afternoon.

Work out the fraction of the grapes that she has **not** eaten.

.... [2]

---

5 **4024/12/M/J/23/Q1**

Work out.

(a) $3.25 - 1.73$

.... [1]

(b) 1.2^2

.... [1]

---

6 **4024/12/M/J/23/Q8**

Work out $1\frac{3}{4} + \frac{5}{6}$.

Give your answer as a mixed number in its simplest form.

.

.... [2]

---

7 **4024/12/M/J/23/Q14**

(a) Write 325 as a product of its prime factors.

.... [2]

(b) $P = x^n y^2$ and $Q = x^{n-1} y^4$, where x and y are prime.

Find the highest common factor (HCF) of P and Q.
Give your answer in terms of x, y and n.

.... [2]

2022

,   4024/11/O/N/22/Q11

(a) Write 120 as a product of its prime factors.

.... [2]

(b) $315 = 3^2 \times 5 \times 7$

Use this information to find the smallest integer value of *n*, such that 315*n* is a square number.

.... [1]

-   4024/12/M/J/22/Q12

(a) Write   0.002 035 61   correct to 3 significant figures.

.... [1]

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

$$\frac{\sqrt{3.93} \times 63.7}{0.425}.$$

.... [2]

4024/11/M/J/22/Q6

Write down

(a) a prime number between 10 and 15,

.... [1]

(b) an irrational number between 10 and 15.

.... [1]

4024/1%A/>/2&/Q1

(a) Write down the value of the 5 in the number 253 624.

.... [1]

(b) The crowd at a sports event is exactly 35 687.

Write this number correct to the nearest ten.

.... [1]

2021

4024/12/O/N/21/Q13

The mean of five numbers is 17.

The numbers are listed in order of size, starting with the smallest.
The three smallest numbers are equal.
The middle three numbers add to 35.
The largest number is four times the smallest number.

List the five numbers in order of size.

....................., ..., ..., ... [3]
smallest

%   4024/12/O/N/21/Q9

(a) Write 216 as a product of its prime factors.

.... [2]

(b) Two positive integers are each greater than 25.
Their lowest common multiple (LCM) is 216.
Their highest common factor (HCF) is 18.

Find the two integers.

.... and .... [2]

%   4024/11/O/N/21/Q14

(a) Express 60 as the product of its prime factors.

.... [2]

(b) A school buys packs of pens and packs of rulers.
There are 60 pens in each pack of pens.
There are 42 rulers in each pack of rulers.
The school wants to buy exactly the same number of pens and rulers.
Work out the smallest number of each pack the school should buy.

.... packs of pens

.... packs of rulers [3]

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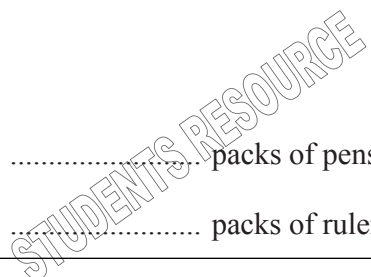
9   **4024/%%/C/B/2%Q%**

  (a) Work out $\dfrac{7}{8} - \dfrac{1}{4}$.

.... [1]

  (b) Work out 0.08×0.2 .

.... [1]

%   **4024/12/M/J/21/Q10**

  (a) Write 270 as the product of its prime factors.

.... [2]

  (b) Find the highest common factor (HCF) of 270 and 225.

.... [2]

%+   **4024/11/M/J/21/Q6**

  (a) Write 308 as a product of its prime factors.

.... [2]

  (b) Find the highest common factor (HCF) of 308 and 66.

.... [1]

%   4024/11/M/J/21/Q2

$$15 \qquad 125 \qquad \sqrt{8} \qquad 11 \qquad \sqrt{25} \qquad 14 \qquad 60$$

From the numbers above, write down

(a) a factor of 70,

.... [1]

(b) a cube number,

.... [1]

(c) an irrational number.

.... [1]

2020

% 4024/11/O/N/20/Q24

(a) Express 99 as the product of prime factors.

.... [1]

(b) Expressed as the product of prime factors,

$$p = 2^{n+2} \times 3^n \times 5 \quad \text{and} \quad q = 2^n \times 3^{n+1} \times 5^2$$

where n is a positive integer.

(i) The lowest common multiple (LCM) of p and q is $2^n \times 3^n \times R$.

Express R as the product of prime factors.

$R =$ .... [2]

(ii) Express $p + q$ as the product of prime factors.

.... [2]

&$ 4024/12/M/J/20/Q13

" (a) Write 108 as the product of its prime factors.

.... [2]

(b) Find the lowest common multiple (LCM) of 108 and 180.

.... [2]

&% **4024/11/M/J/20/Q6**

Safoora is buying some apples, bananas and peaches.
She can buy
- packs of 6 apples
- packs of 5 bananas
- packs of 12 peaches.

She needs to buy the **same** number of each fruit.

Calculate the smallest number of packs of apples, bananas and peaches that she needs to buy.

.... packs of apples

.... packs of bananas

....................packs of peaches [2]

2019

&& 4024/12/O/N/19/Q3

$$\sqrt{35} \qquad \sqrt{36} \qquad 36 \qquad \frac{36}{37} \qquad 37 \qquad \frac{37}{36} \qquad 3.7$$

From this list of numbers, write down

(a) a prime number,

.... [1]

(b) a square number,

.... [1]

(c) an irrational number.

.... [1]

&' 4024/11/O/N/19/Q14

$$p = 2^3 \times 3 \times 5^2 \qquad q = 2 \times 3^2 \times 5$$

(a) Find the highest common factor (HCF) of p and q.

.... [1]

(b) Find the lowest common multiple (LCM) of p, q and 21.
Give your answer as the product of prime factors.

.... [1]

(c) Find the smallest integer N, such that pN is a square number.

$N = $ .... [1]

2018

8(**4024/11/O/N/18/Q17**

$$120 = 2^3 \times 3 \times 5$$

(a) Express 1200 as the product of its prime factors.

Answer .... [1]

(b) Find the smallest value of *n*, such that $120n$ is a square number.

Answer .... [1]

---

8)   **4024/11/O/N/18/Q8**

(a) Write down an irrational number which has a value between 4 and 5.

Answer .... [1]

(b) Kofi is using number cards to form a 5-digit number.
His number is a multiple of 8.
Complete the final digit of his number.

| 1 | 2 | 3 | 4 | |

[1]

&*   4024/12/M/J/18/Q20(b)

Find the smallest positive integer *M*, given that *MN* is a cube number.

Answer   M = ... [1]

2017

&+   4024/12/M/J/17/Q20(a)

(i)   Write 54 as the product of its prime factors.

Answer   .... [1]

(ii)   Find the smallest possible integer *m* such that 54*m* is a cube number.

Answer   m = ... [1]

&,   **4024/11/M/J/17/Q4**

(a) Express 36 as the product of its prime factors.

Answer .... [1]

(b) Write down two prime numbers whose sum is 15.

Answer .... [1]

&   **4024/11/M/J/17/Q8(a)**

A car travels at 84 km/h.
Calculate the number of metres that the car travels in one minute.

Answer .... m [1]

2016

' $ **4024/12/M/J/16/Q6**

(a) Express 96 as a product of its prime factors.

Answer .... [1]

(b) 24 is a common factor of 96 and the integer *n*.

Given that *n* is less than 96, find the largest possible value of *n*.

Answer .... [1]

' % 4024/11/M/J/16/Q21

(a) Express 500 as the product of its prime factors.

Answer .... [1]

(b) $M = 2 \times 3^2$ $N = 2^4 \times 3^2$

Find the values of p and q when

(i) $M \times N = 2^p \times 3^q$,

Answer $p =$ .... $q =$ .... [1]

(ii) $M \div N = 2^p \times 3^q$,

Answer $p =$ .... $q =$ .... [1]

(iii) $N^2 = 2^p \times 3^q$.

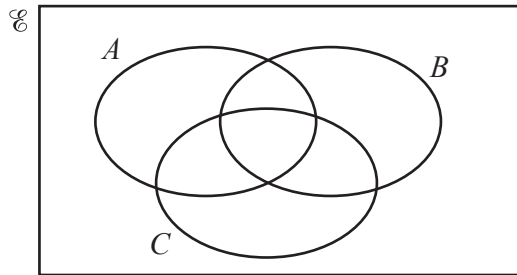*Answer* $p =$ .... $q =$ .... [1]

2. Set Language and Notation

2023

1   **4024/12/M/J/23/Q19**

(a) In the Venn diagram, shade the region represented by $(A \cap B') \cup (B \cap C')$

[1]

(b) One morning 50 people visit a library.

- 35 of them borrow a book.
- 12 of them use a computer.
- 8 of them do not borrow a book and do not use a computer.

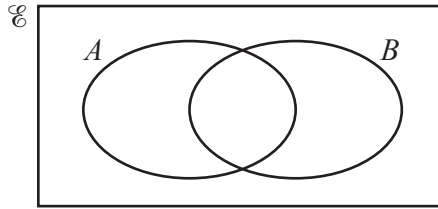Using a Venn diagram, or otherwise, find the number of people who use a computer but do not borrow a book.

.... [2]

202&

2   **4024/11/O/N/22/Q9**

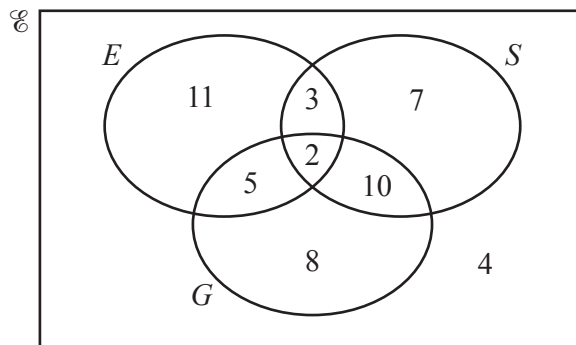 **(a)**   In the Venn diagram, shade the region represented by $A \cap B$.

                                                                              [1]

  (b)   This Venn diagram shows information about the number of students who study English (E), Spanish (S) and German (G).

      (i)   Find the number of students who study English and German but not Spanish.

                                                      .... [1]

      (ii)   Find $\text{n}(G \cup S)'$.

                                                       .... [1]