EXAMINATIONS COUNCIL OF LESOTHO
Lesotho General Certificate of Secondary Education

CANDIDATE NAME																
CENTRE NUMBER						CANDIDATE NAME										

MATHEMATICS
Paper 2 (Extended)

0178/02
May/June 2022
1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments
Tracing Paper (optional)

READ THESE INSTRUCTIONS FIRST

Write your name, centre number and candidate number 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.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
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 70.

This document consists of **12** printed pages.

Examinations Council of Lesotho

[Turn over

1 **(a)** Write, in terms of a and b, the highest common factor of $16a^3b^3$ and $6a^2b$.

..... [1]

(b) $p = \frac{1}{t}$.

Evaluate p when $t = 4\frac{1}{4}$.

..... [1]

---

2 Evaluate

(a) $\frac{7}{12} - \frac{1}{4}$,

..... [1]

(b) $566 \times 36 - 566 \times 26$,

..... [1]

(c) $0.0004 + \frac{3}{1000}$.

Give your answer in standard form.

..... [2]

..... [2]

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3 Arrange in order of size, starting with the **smallest**.

$\sqrt{2^4 \times 5^2}$, 3×2^3, $\sqrt[3]{6^3 \times 3^3}$, $\sqrt{5^2} \times 2^3$.

....., ..., ..., ... [2]

smallest

---

4 By rounding each of the values to 1 significant figure, estimate

0.612 of 13% of M 2169.

M..... [2]

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5 $\boldsymbol{A} = \begin{pmatrix} 1 & 4 \\ 2 & 6 \end{pmatrix}$

Find

(a) $3\boldsymbol{A}$,

( ) [1]

(b) $\boldsymbol{B}$ if $\boldsymbol{AB} = \mathbf{I}$.

[2]

[Turn over

6 A straight line passes through points $(1,\ p)$ and $(3,\ 1)$ and has gradient $\frac{1}{4}$.

(a) Find p.

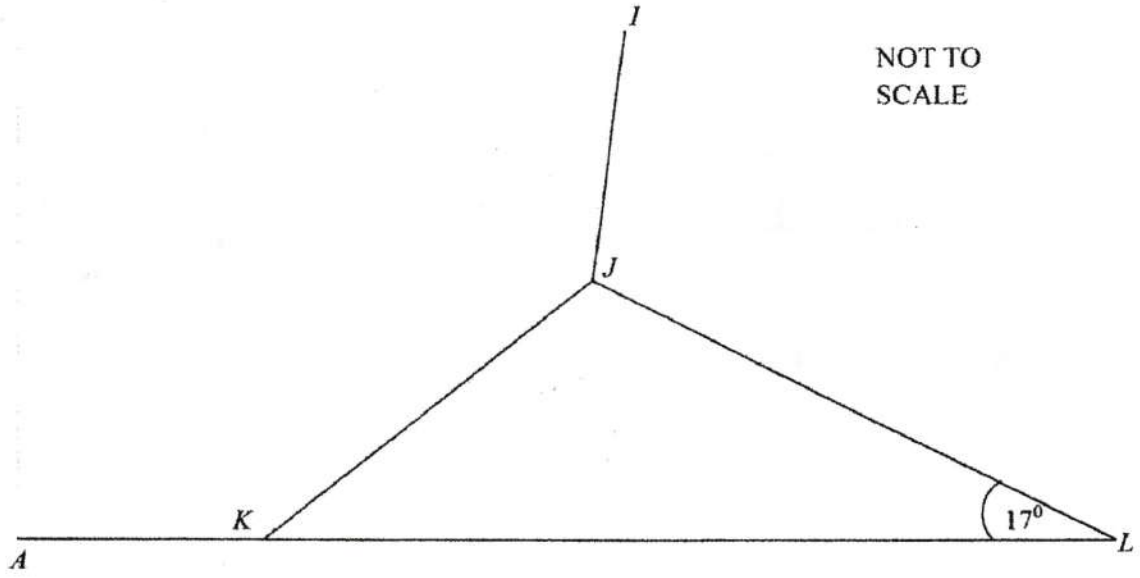
$p =$ ..... [2]

(b) Show that the points are $\frac{\sqrt{17}}{2}$ units apart?

..... [2]

7 $AKJI$ is part of a regular decagon.
Angle $KLJ = 17°$ and AKL is a straight line.

Calculate the size of angle KJL.



Angle KJL =.....° [2]

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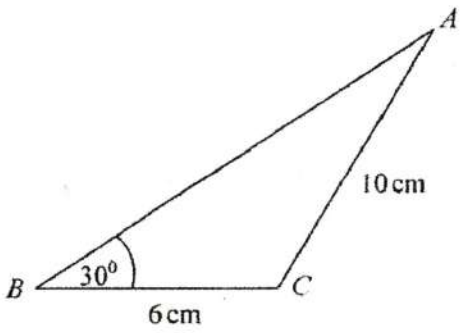
8 A quadratic equation $ax^2 + bx - 1 = 0$ has solutions $\frac{1}{4}$ and -1.
Find the value of a and the value of b.

a =.....

b =..... [2]

[Turn over

9 In the triangle ABC, $BC = 6$ m, $AC = 10$ m and angle $ABC = 30^0$.
$\text{Sin}\,30^0 = 0.5$, $\text{Cos}\,30^0 = 0.866$ and $\text{Tan}\,30^0 = 0.577$.



NOT TO SCALE

Show that $\text{Sin}\,A = 0.3$.

[2]

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10 A car painting compressor makes a paint thickness of p when held at distance q from the car.
p is inversely proportional to the square of q, and $p = 0.2$ when $q = 10$.

Calculate the value of p when $q = 5$.

$p =$..... [3]

---

11 Given that $-7 \leq x \leq 3$ and $-2 \leq y \leq 4$.

Find

(a) the smallest possible value of xy,

..... [1]

(b) the greatest possible value of $x^2 - y^2$.

..... [1]

---

12 Two similar solids have base areas $5\,\text{cm}^2$ and $45\,\text{cm}^2$.
The smaller solid has volume $2\,\text{cm}^3$.

Find the volume of the larger solid.

.....cm^3 [3]

---

13 $\overrightarrow{PQ} = \begin{pmatrix} 8 \\ -4 \end{pmatrix}$ and $\overrightarrow{PR} = \begin{pmatrix} 14 \\ 0 \end{pmatrix}$.

Find

(a) $\overrightarrow{QR}$.

( ) [2]

(b) $|\overrightarrow{PQ}|$.

..... [2]

---

14 **(a)** Express as a single fraction in its simplest form.

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

.....[2]

(b) $m = \frac{1}{2}$ and $n = -2$.

Evaluate $\frac{4}{m} - \frac{10}{n}$.

..... [3]

(c) Remove the brackets and simplify.

$(y-3)^2 - (y+2)^2$

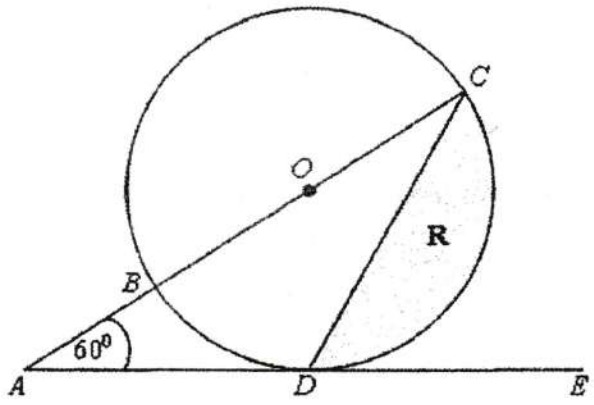
..... [3]

(d) $9a^2 - 12ab + 4b^2 = 0$.

Find the ratio $a : b$ in its simplest form.

..... : ..... [3]

15 B, C, and D lie on a circle, centre O.
ADE is tangent to the circle at D.
$ABOC$ is a straight line and angle $CAD = 60^0$.



NOT TO SCALE

(a) Write the special name for

(i) the line CD, ... [1]

(ii) the shaded region labelled **R**. ..... [1]

(b) Find the value of angle CDE.

..... [3]

16 The table shows the number of siblings recorded by a group of students.

Number of siblings	0	1	2	3	4
Number of students	24	28	n	7	3

(a) Find the smallest possible value of n for which the median number of siblings is 2.

..... [2]

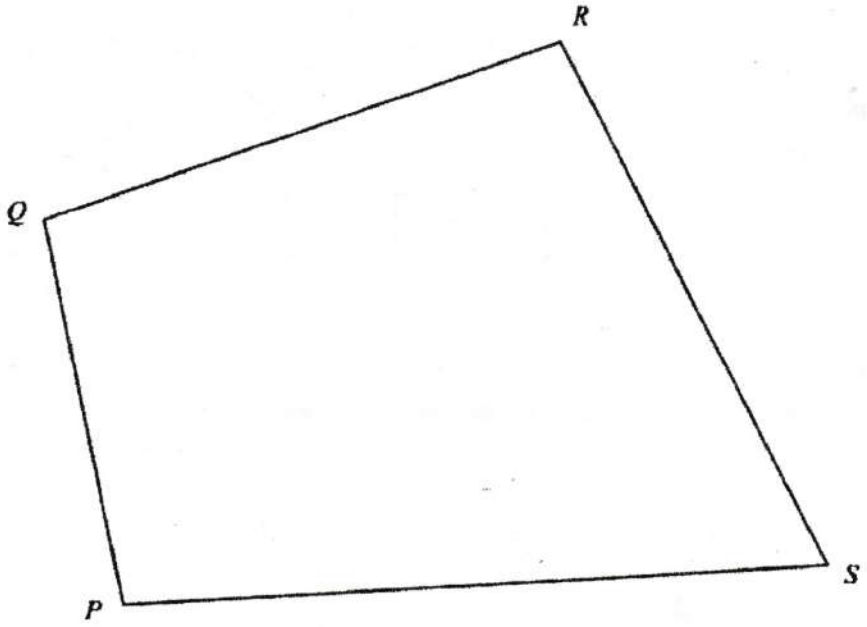
(b) Find the value of n if the mean number of siblings is 1.

$n =$..... [3]

(c) Find the probability that a student picked randomly from this group has at least 3 siblings. Give your answer in terms of n.

..... [2]

18 The diagram shows a plot $PQRS$.



A tank inside the plot $PQRS$ is:

- nearer to PS than to PQ,
- nearer to P than to S and
- nearer to Q than to P.

Show, by shading, the region where the tank may be located. [4]