EXAMINATIONS COUNCIL OF LESOTHO
Lesotho General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	CANDIDATE NUMBER

MATHEMATICS **0178/02**

Paper 2 (Extended) **October/November 2016**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments
Tracing Paper (optional)

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 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 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.

[Turn over

1 Lineo spends $7\frac{1}{2}$ hours at the stadium watching games.
She leaves the stadium at 4.20 p.m.

At what time did she arrive at the stadium?

Answer ..... [2]

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2 **(a)** Express 120 as a product of its prime factors.

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

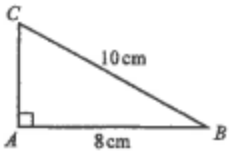
(b) Given that $120k$ is a perfect square, write down the smallest possible value of k.

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

(c) Find the highest common factor of 120 and 180.

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

3



NOT TO SCALE

Work out the length AC.

4 Solve the simultaneous equations.

$3x - 2y = 4$
$5x - 4y = -3$

Answer $x =$ .....

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

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5 A polygon has n sides.
Two of its exterior angles are 23° and 85°, while the other $(n - 2)$ exterior angles are 14° each.

Calculate the value of n.

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

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6 Find the integer values of x for which $1 - x < 3x + 5 \leqslant x + 9$.

Answer ..... [3]

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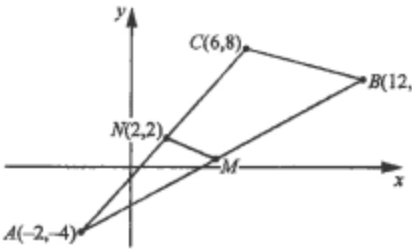
7 In the diagram, M and N are the midpoints of AB and AC respectively.
BC and MN are parallel.



NOT TO SCALE

(a) Find the coordinates of M.

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

(b) Find the gradient of BC.

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

(c) Write the equation of MN.

Answer (c) ..... [2]

(d) Find the length of AC.
Leave your answer in the form $\sqrt{r}$.

Answer (d) ..... [2]

8 Factorise completely

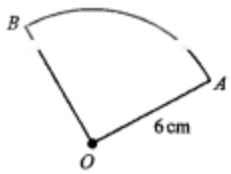
(a) $20ax - by - 5ay + 4bx$,

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

(b) $2x^2 - 18$ and **hence** find the prime factors of 182.

Answer (b) prime factors ..... [3]

9



NOT TO SCALE

The area of the sector is $12\pi\ \text{cm}^2$.

Work out the length of the arc AB.
Give your answer in terms of π.

Answer ..... cm [3]

10 Khaola makes a map of Mafeteng District and uses a scale of 1 : 50 000.
The area of a village on his map is 8 cm^2.

Calculate, in **square kilometres**, the actual area of the village.

Answer ..... km^2 [2]

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11 $\mathbf{A} = \begin{pmatrix} -5 & 7 \\ 3 & -4 \end{pmatrix}$

Find $\mathbf{A}^{-1}$.

Answer ..... [2]

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12 **(a)** y is inversely proportional to x^3.
When $y = 9$, $x = 3$.

Find y when $x = 10$.

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

(b) p is directly proportional to q^2.

Find the percentage increase in the value of p when q is increased by 50%.

13 **(a)** Simplify $\frac{3^{x+3} - 3^{x+1}}{3^{x+1}}$.

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

(b) Given that $\frac{y^4 \times \sqrt{y}}{y^{-3}} = y^n$, find the numerical value of n.

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

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14 The probabilities that three football teams, A, B and C, win their next game are $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{5}$ respectively.

Find the probability that

(a) none of the three teams win,

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

(b) one of the three teams wins.

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

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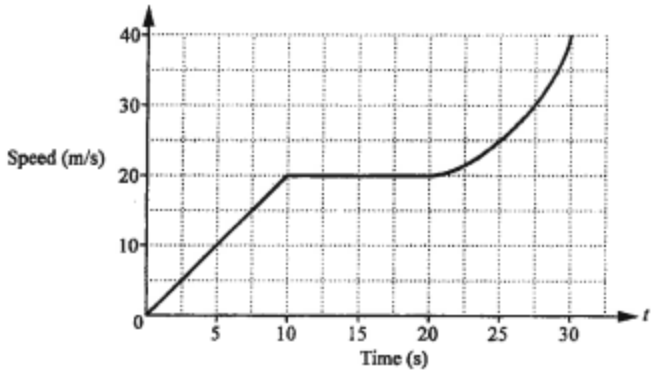
15 The diagram shows the speed-time graph for the first 30 seconds of a car journey.



(a) Calculate the acceleration when $t = 8$ seconds.

Answer (a) ..... m/s^2 [1]

(b) Calculate the distance travelled during the first 20 seconds.

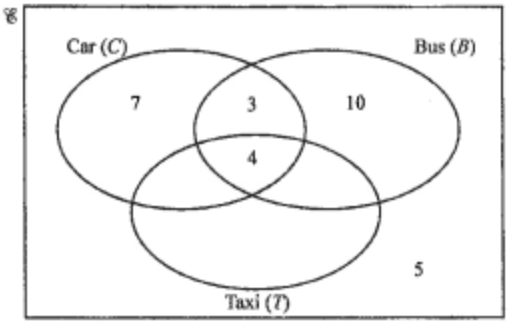
Answer (b) ..... m [2]

(c) When $t = 30$ seconds, the car decelerates at $8\,m/s^2$.

Find the time taken for the car to come to rest.

Answer (c) ..... s [2]

16 In a survey, 40 teachers are asked which forms of transport they regularly use.
The Venn diagram shows part of the information about their responses.



16 teachers use a car.
8 teachers use a taxi **only**.

(a) **(i)** Complete the Venn diagram. [2]

(ii) Find the number of teachers who use both bus and taxi.

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

(b) **(i)** Find $n(C \cap (B \cap T)')$.

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

(ii) Describe in **words** what the 5 in the Venn diagram represents.

Answer (b)(ii) .....

.....

..... [1]

17 **(a)** The numbers show goals scored in six football games.

8 x 1 2 11 1

Given that the median is $3\frac{1}{2}$, find the value of x.

Answer (a) $x =$ ..... [2]

(b) The mean of eight numbers is 3.
The mean of a different set of twelve numbers is y.

Given that the mean of these twenty numbers is 9, calculate the value of y.

Answer (b) $y =$ ..... [3]

18 The table shows the length, l mm, of 40 leaves.

Length of a leaf (l mm)	$0 < l \leqslant 10$	$10 < l \leqslant 20$	$20 < l \leqslant 60$	$60 < l \leqslant 80$
Frequency	6	20	4	10

(a) Find the modal class.

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

(b) Calculate an estimate of the mean.

Answer (b) ..... mm [4]

(c) On a histogram, the height of the interval $60 < l \leqslant 80$ is 2.5 cm.

Calculate the height of the interval $10 < l \leqslant 20$.

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