EXAMINATIONS COUNCIL OF LESOTHO
Lesotho General Certificate of Secondary Education

CANDIDATE NAME														
CENTRE NUMBER						CANDIDATE NUMBER								

MATHEMATICS **0178/02**

Paper 2 (Extended) **October/November 2018**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments
Tracing Paper (optional)

226

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.
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.

A001

1 **(a)** The number of people at a football match is 27359.

Write the number to **one** significant figure.

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

(b) The number of people who sat in stand A is 2500 correct to two significant figures.

Find the largest number of people that could have sat in stand A.

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

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2 A rectangular painting measures 4.5×10^3 mm by 3×10^2 mm.

Calculate, giving your answer in standard form,

(a) the perimeter of the painting,

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

(b) the area of the painting.

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

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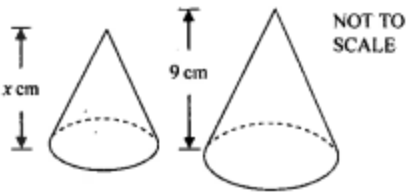
3 The diagram shows two solid cones which are geometrically similar.

The height of the smaller cone is x cm and that of the larger one is 9 cm.



The volume of the smaller cone is 32 cm^3 and the volume of the larger cone is 108 cm^3.

Calculate the value of x.

Answer ..... [3]

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4 Given that $\begin{pmatrix} 2 & 4 \\ a & 3 \end{pmatrix} + k\begin{pmatrix} 3 & 1 \\ 0 & -2 \end{pmatrix} = \begin{pmatrix} 8 & 6 \\ -3 & -1 \end{pmatrix}$.

(a) Find the values of a and k.

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

(b) Given that $\begin{pmatrix} 1 & -2 \\ x & 4 \end{pmatrix}$ has no inverse find the value of x.

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

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5 **(a)** Express $\frac{x-1}{3}-\frac{2x-1}{2}$ as a single fraction.

Write your answer as simply as possible.

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

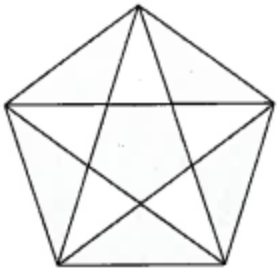
(b) $\frac{1}{x-1}-\frac{3}{x}+1$ can be written as $\frac{x^2+bx+c}{x(x-1)}$.

Find the value of b and the value of c.

Answer (b) $b =$ .....

$c =$ ..... [3]

6 The diagram shows a logo in the shape of a regular polygon.



(a) State the name of the regular polygon.

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

(b) Write the total number of isosceles triangles that are only white or only grey.

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

(c) State the order of rotational symmetry of the logo.

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

(d) Find the size of the interior angle of the regular polygon.

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

7 **(a)** Solve.

$5 \times 2^y = 320$

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

(b) Solve the simultaneous equations.

$bx + y = b$
$ax - y = a$

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

8 (a) Mpho's salary is M4 400.

(i) Calculate her new salary after a 5% increase.

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

(ii) The M4 400 was a 10% increase on her previous salary.

Calculate Mpho's previous salary.

Answer (a)(ii) M ..... [3]

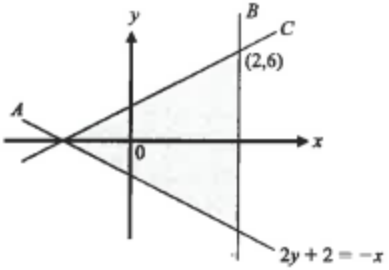
(b) Thato and Pule share M3 500 in the ratio 3:2.

Calculate Pule's share.

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

9 The diagram shows a region enclosed by three straight lines A, B and C.

The equation of line A is $2y + 2 = -x$.



(a) Show that the equation of the line C is $2y = 3x + 6$.

[3]

(b) Write down **three** inequalities which satisfy the shaded region.

Answer (b) .....

.....

..... [3]

(c) For a point (x, y) in the shaded region, find the minimum value of $x - y$.

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

10 Here is a list of numbers.

36 29 41 45 15 10 13

(a) Find the median.

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

(b) Find the probability that a number chosen at random from this list is prime.

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

(c) Thirteen more numbers are added to the list.

The smallest of the thirteen numbers is 14 while the largest number is 48.

(i) Calculate the range of the 20 numbers now in the list.

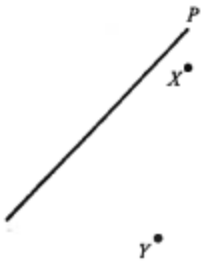
Answer (c)(i) ..... [1]

(ii) The mean of **all the twenty** numbers is 19.2.

Calculate the mean of the added thirteen numbers.

Answer (c)(ii) ..... [3]

11 The diagram shows the position of the two houses X and Y and a path P.



Scale 1 cm represents 25 m

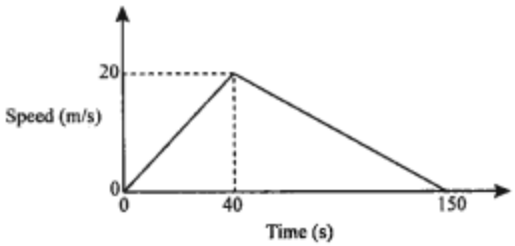
A public phone is installed such that it is

- less than 125 m from X
- nearer to Y than X
- more than 100 m from the path. [4]

Using ruler and compasses only, find the region where the public phone can be placed.

Label it T. [1]

12 The diagram shows the speed-time graph of a toy truck.



Calculate

(a) the acceleration during the first 40 seconds,

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

(b) the time, in seconds, it takes to reach the speed of 15 m/s for the first time,

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

(c) the total distance travelled in metres.

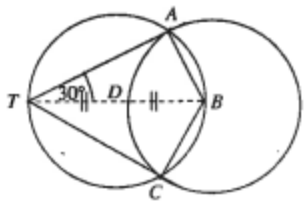
Answer (c) ..... m [2]

13 The diagram shows two circles, one with centre B and another centre D.

The two circles intersect at A and C.

T is the point on one circle from which TA and TC are tangents to the other circle.

Angle $ATB = 30°$



NOT TO SCALE

(a) Explain why the two circles are equal.

Answer (a) .....

..... [1]

(b) Find

(i) angle ATC,

Answer (b)(i) angle ATC = ... [1]

(ii) the reflex angle ABC.

Answer (b)(ii) Reflex angle ABC = ... [2]

14 f is directly proportional to n^2.

(a) **(i)** Given that $f = 6$ when $n = 2$.

Find an equation for f in terms of n.

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

(ii) Find f when $n = 8$.

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

(b) Another number, p, is directly proportional to $2n^2$.

Show that f is directly proportional to p.

[3]