EXAMINATIONS COUNCIL OF LESOTHO
Lesotho General Certificate of Secondary Education

CANDIDATE NAME															
CENTRE NUMBER						CANDIDATE NUMBER									

MATHEMATICS **0178/03**

Paper 3 (Core) **October/November 2019**

2 hours

Candidates answer on the Question Paper.

Additional Materials: Electronic Calculator
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 should be used.
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.

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 100.

This document consists of **14** printed pages and **2** blank pages.

1 **(a)** Thabo buys a car for M40 000 and then sells it at a loss of 5%.

Calculate the selling price.

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

(b) A piece of land increases in value from M50 000 by 4% every year.

Calculate the price of the land after three years.

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

(c) A shop sells milkshakes in two sizes.

The small milkshake is 300 ml and the large milkshake is $\frac{2}{3}$ more than the small milkshake.

(i) Find the size of the large milkshake.

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

(ii) Express as a **ratio**, in its simplest form, the size of the small milkshake to the large milkshake.

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

(d) Lineo invests M12 000 at r % simple interest per annum.

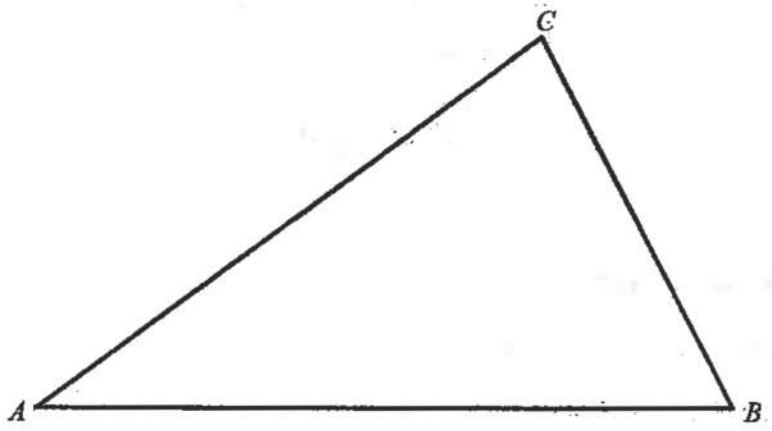
The value of her investment after three years is M17 400.

Calculate the value of r.

Answer (d) r = ... [4]

2 The diagram represents a triangular field ABC.

Scale: 1 cm to 50 m.



(a) Find the actual distance from A to B.

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

(b) Construct the locus of all points, inside the field, that are

(i) 150 m from AB, [2]

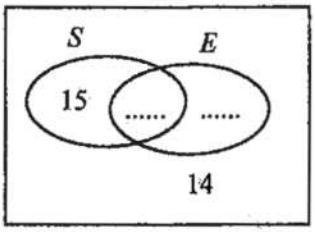
(ii) equidistant from AB and BC. [2]

(c) A tree is to be planted inside the field so that it is
- less than 150 m from AB, and
- closer to BC than to AB.

Shade the possible region in which the tree can be planted. [2]

3 In a class of 55 students, 20 are members of Science club (S), and some are members of English club (E).

The other information is shown in the Venn diagram.



(a) Complete the Venn diagram. [2]

(b) Find the number of students who are members of

(i) Science club **but not** English club,

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

(ii) English club.

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

(c) Find $n(E \cap S)$

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

(d) Describe, in words, the set $S' \cap E$.

Answer (d) .....

..... [1]

(e) Find the probability that a student chosen at random from the class is a member of

(i) **neither** English club **nor** Science club,

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

(ii) exactly **one** club.

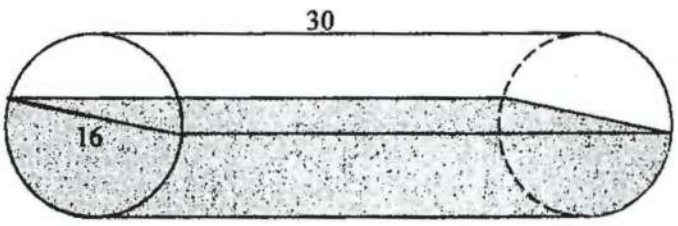
Answer (e)(ii) ..... [2]

(f) Five more students in the class join the Science club.

Calculate the **increase** in probability that a student chosen is a member of the Science club.

Answer (f) ..... [2]

4 The diagram shows a cylindrical container resting on a horizontal surface.
The container has a diameter of 16 cm and length 30 cm.
The container is half-filled with water as shown in the diagram.



NOT TO SCALE

(a) Calculate the **total** surface area of the container in contact with the water.

Answer (a) ..... cm^2 [3]

(b) Calculate the volume of water in the container.

Answer (b) ..... cm^3 [2]

(c) Water leaks from the container at a rate of 5 cm^3 per second.

Calculate the time, in **minutes** and **seconds**, it takes the container to be emptied.

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

5 The table shows some values of $y = x^2 + x - 2$.

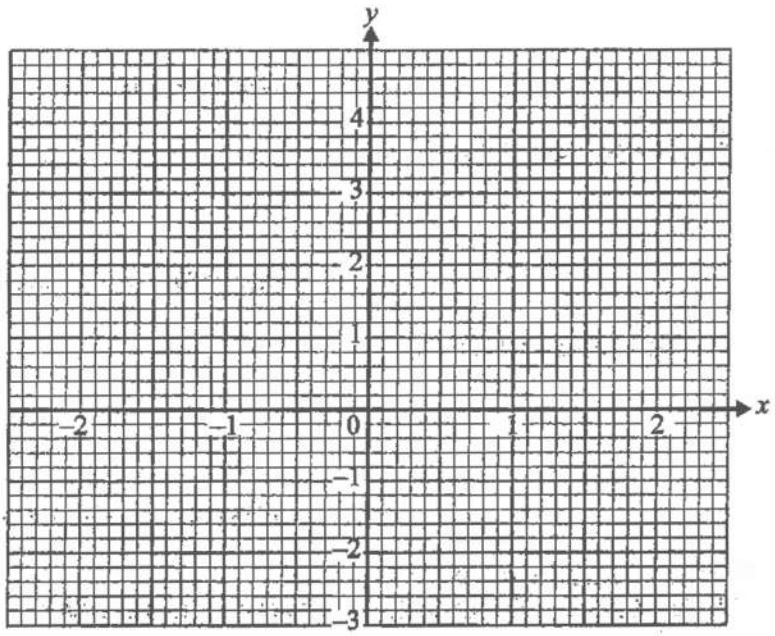
x	-2	-1.5	-1	0	0.5	1	1.5	2
y	0	-1.25	-2	-2	p	0	q	4

(a) Calculate the value of p and the value of q.

Answer (a) $p =$ ..... [1]

$q =$ ..... [1]

(b) On the grid, draw the graph of $y = x^2 + x - 2$ for $-2 \leq x \leq 2$.



[4]

(c) Write the equation of the line of symmetry of the graph. [1]

(d) (i) On the same grid, draw the graph of $x + y = 2$. [2]

(ii) Write down the coordinates of the point where the two graphs intersect for $-2 \leq x \leq 2$.

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

6 The table shows the number of items bought by 50 students.

Number of items bought	5	6	7	8	9	10	11	12
Number of students	5	6	8	7	10	6	5	3

(a) Find the number of students who bought

(i) 10 items,

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

(ii) less than 11 items.

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

(b) Find the median number of items bought.

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

(c) Calculate the mean number of items bought.

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

(d) A bar chart is drawn to represent the results.
The height of the bar for the number of students who bought 5 items is 2.5 cm.

Find the height of the bar for the number of students who bought 9 items.

Answer (d) ..... cm [1]

(e) Find the probability that a student chosen at random bought at least 10 items.

Answer (e) ..... [2]

7 **(a)** $P = \frac{m^2}{2} - x$.

(i) Find the value of P when $m = 8$, and $x = -4$.

Answer (a)(i) $P =$ ..... [2]

(ii) Make x the subject of the formula.

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

(b) Factorise.

$x^2 - 3x - 28$

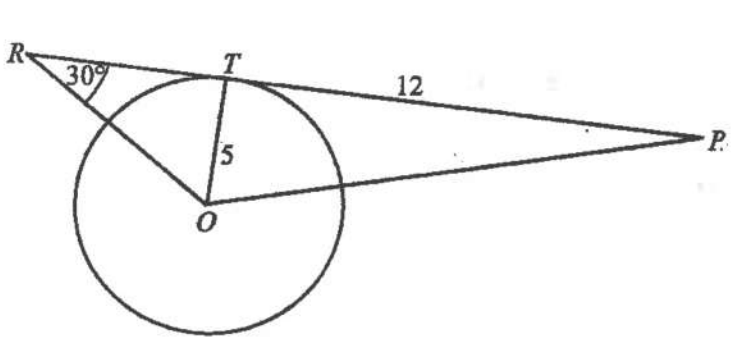
Answer (b) ..... [2]

(c) Solve the simultaneous equations.

$x + 3y = 7$
$2y - x = 3$

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

8 The diagram shows a circle, centre O, radius 5 cm.
RTP is a tangent to the circle at T, and TP = 12 cm.
Angle ORT = 30°.



NOT TO SCALE

(a) Calculate

(i) OP,

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

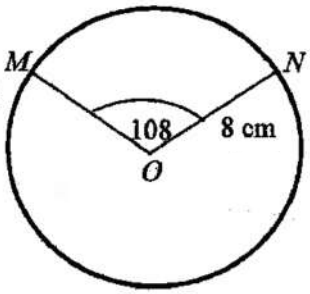
(ii) angle OPT,

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

(iii) angle ROP.

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

(b) The diagram shows a circle, centre O, radius 8 cm.
Angle $MON = 108°$.



NOT TO SCALE

Calculate

(i) the area of the minor sector MON,

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

(ii) the perimeter of the major sector MON.

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

9 Thato wants to paint four identical walls of a house using 25.6 litres of paint on each wall. He buys paint in 5 litre containers, at M400 per container.

(a) Calculate

(i) the number of 5 litre containers needed to paint one wall,

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

(ii) the total amount that Thato will pay for painting all the four walls.

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

(b) A shop charges a normal price on the first **ten** 5 litre containers and gives a discount of 40% on each additional container bought.

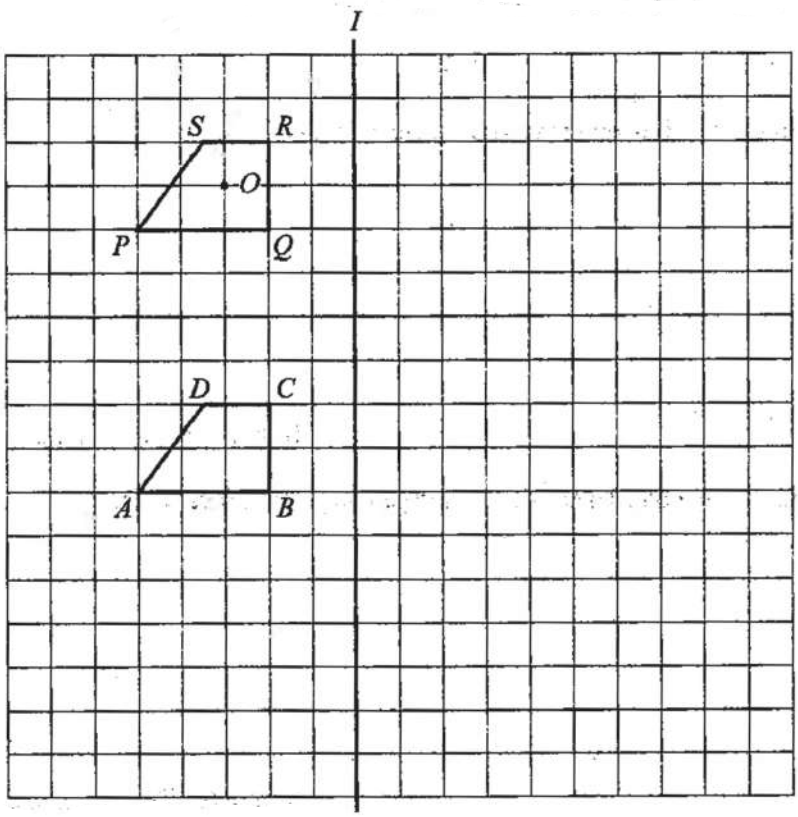
(i) Calculate the **total discount** offered.

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

(ii) Find the **total amount** paid.

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

10 The line l, the point O and the quadrilaterals $ABCD$ and $PQRS$ are shown on the grid.



(a) Write down the name of quadrilateral $ABCD$.

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

(b) Describe a **single** transformation which maps $ABCD$ onto $PQRS$.

Answer (b) .....

..... [2]

(c) Reflect $ABCD$ along line l. [2]

(d) Rotate $ABCD$ through 90° clockwise, centre A. [2]

(e) Enlarge $PQRS$ using scale factor 2, centre O. [2]