Candidate Name	Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

MATHEMATICS 4004/1

PAPER 1

NOVEMBER 2018 SESSION **2 hours 30 minutes**

Additional materials:
Candidates answer on the question paper
Geometrical Instruments

Allow candidates 5 minutes to count pages before the examination.
This booklet should not be punched or stapled and pages should not be removed.

INSTRUCTIONS TO CANDIDATES

Write your Name, Centre number and candidate number in the spaces at the top of this page.

Write your centre and candidate number in the box on the top right corner of every page of this paper.

Check that all the pages are in the booklet and ask the invigilator for a replacement if there are duplicate or missing pages.

Answer **all** questions.

Write your answers in the spaces provided on the question paper using **black** or **blue** pens.

If working is needed for any question, it must be shown in the space below that question. Omission of essential working will result in loss of marks.

Decimal answers which are not exact should be given correct to three significant figures unless stated otherwise.

Mathematical tables, slide rules and calculators should not be bought into the examination room

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question

This question paper consists of 20 printed pages and 0 blank page(s).

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Answer all questions.

NEITHER MATHEMATICAL TABLES NOR SLIDE RULES NOR CALCULATORS MAY BE USED IN THIS PAPER.

1. a) Simplify $\frac{2^3}{5^2}$ giving the answer as a fraction.

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

b) Express

i) $\frac{6}{25}$ as a decimal fraction,

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

ii) 0,125 in standard form.

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

2. The following is a list of real numbers:

$\frac{3}{7}$; 11; $\sqrt{\frac{3}{2}}$; 121; –19; π; $\sqrt{64}$.

Choose from the list

a) a square number,

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

b) irrational numbers.

(b) ..... **[2]**

3. a) Express $4 \times 5^3 + 3 \times 5^2 + 2$ as a number in base 5.

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

b) Evaluate

i) $10111_2 + 1010_2$ giving the answer in base 2.

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

ii) $512^7 - 435^7$ giving the answer in base 7.

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

4. a) Express 00 45 in 12 hour notation.

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

b) Gortha's local time is 3 hours 45 minutes ahead of Harare's local time.

Find the time in Harare when the time in Gortha is 21 23.

(b) ..... [1]

c) Convert 5 km^2 to hectares.

(c) ..... [1]

5. a) Express $6,07 \times 10^4$ in ordinary form.

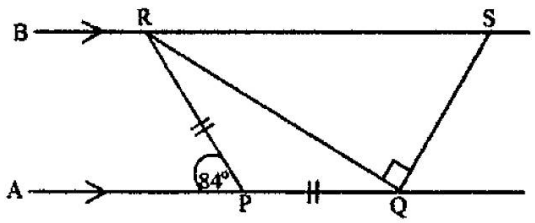
Answer (a) ..... [1]

b) Evaluate $2,53 \times 10^1 + 6,1 \times 10^{-1}$, giving the answer in standard form.

(b) ..... [2]

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6.



In the diagram AQ and BS are parallel lines such that

PQ = PR, $A\hat{P}R = 84°$ and $R\hat{Q}S = 90°$.

Find

a) $P\hat{R}Q$,

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

b) $Q\hat{R}B$,

(b) ..... **[1]**

c) $Q\hat{S}R$.

(c) ..... **[1]**

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7. Solve the simultaneous equations:

$2x + 3y = 11$

$3x - 5y = -12$

Answer .....

..... [3]

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8. The wave length, w, is inversely proportional to its frequency, f.

When $f = 90$, $w = 675$.

Find

a) an equation connecting f and w,

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

b) the value of f when $w = 500$.

(b) ..... **[1]**

9. a) Write 45,3981 correct to 4 significant figures.

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

b) A student spends 8 seconds, correct to the nearest second, to solve a problem.

Find the limits between which this time lies in the form $a \leq t < b$ where a and b are constants and t is the time.

(b) ..... **[2]**

10. a) Factorise $3x^2 - 15x$ completely.

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

b) Find the Highest Common Factor (H.C.F.) of

$8kl^2m$, $28k^2l^3m$ *and* $36l^2mn$.

(b) ..... **[2]**

11. The points A(6; 2) and B(8; 5) lie on a straight line.

Find the

a) gradient of the line AB,

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

b) equation of the line AB, giving the answer in the form $y = mx + c$.

(b) ..... **[2]**

12. Simplify $\frac{2a+6}{a-3} \div \frac{a+3}{a^2-2a-3}$.

Answer ..... **[3]**

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13. a) Express the ratio 3,5 kg : 800 g in its simplest form.

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

b) In 2016 a farmer harvested 4,5 tonnes of maize. This was 20% more than what he had harvested in 2015.

Find the number of tonnes of maize the farmer harvested in 2015.

(b) ..... tonnes **[2]**

14. a) Solve the inequality

$4 - 5x < 2x + 8$.

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

b) Write down the smallest integer that satisfies the inequality

$4 - 5x < 2x + 8$.

(b) ..... **[1]**

15. If $\log a = 3$ and $\log b = 7$,

calculate

a) $\log ab$,

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

b) $\log \frac{1}{b}$,

(b) ..... **[1]**

c) $\log \sqrt[3]{a}$.

(c) ..... **[2]**

16. a) If a function $f(x) = (x + 4)(2x - 1)$,

find $f(3)$.

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

b) Solve the equation

$$\frac{3m}{4} - \frac{m}{3} = 2\frac{1}{2}.$$

(b) ..... **[2]**

17. It is given that vector $p = \begin{pmatrix} 0 \\ -3 \end{pmatrix}$ and vector $q = \begin{pmatrix} x \\ 1 \end{pmatrix}$.

Find

a) $p - q$ in terms of x in its simplest form,

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

b) the possible values of x given that $|p - q| = 5$.

(b) ..... **[3]**

18. a) State the special name given to a **regular** polygon with 4 sides.

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

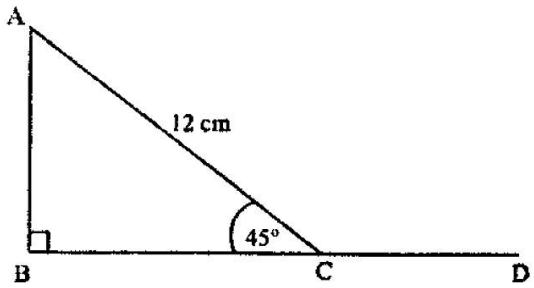
b) The angles of a hexagon are 115°, 89°, $x°$, $x°$, $x°$ and $x°$.

Find the value of x.

(b) ..... **[3]**

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19.



In the diagram, triangle **ABC** is right angled at **B**, **BCD** is a straight line, **AC** = 12 cm and $B\hat{C}A = 45°$.

$[Sin\ 45° = \frac{\sqrt{2}}{2},\ Cos\ 45° = \frac{\sqrt{2}}{2}]$

Using as much of the information given **above** as is necessary,

calculate

a) BC, leaving the answer in surd form,

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

b) Sin $A\hat{C}D$ leaving the answer in surd form,

(b) ..... **[1]**

c) tan $A\hat{C}D$.

(c) ..... **[2]**

20. The table below shows the heights, h, of 50 trees in a school orchard.

Height (h) m	$2 < h \leq 6$	$6 < h \leq 8$	$8 < h \leq 10$	$10 < h \leq 12$
Frequency	*12*	*16*	*12*	*10*

a) Write down the interval which contains

i) the modal height,

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

ii) the median height.

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

b) Calculate an estimate of the mean height of the trees.

(b) ..... **[3]**

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21. The probability that Themba will score in a match is $\frac{1}{3}$. The probability that Allan will score in the same match is $\frac{3}{4}$.

Calculate the probability that in the same match

a) both score,

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

b) neither of them scores,

(b) ..... **[2]**

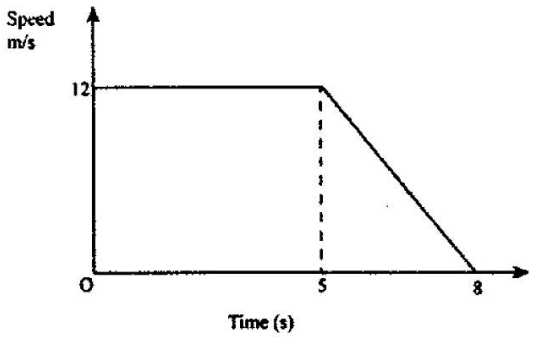
c) only one of them scores.

(c) ..... **[2]**

22. a) Convert a speed of 12 m/s to a speed in km/h.

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

b)



The graph shows the motion of an athlete running on level ground at a constant speed of 12 m/s for 5 seconds. The athlete then retards uniformly to rest after a further 3 seconds.

Calculate the

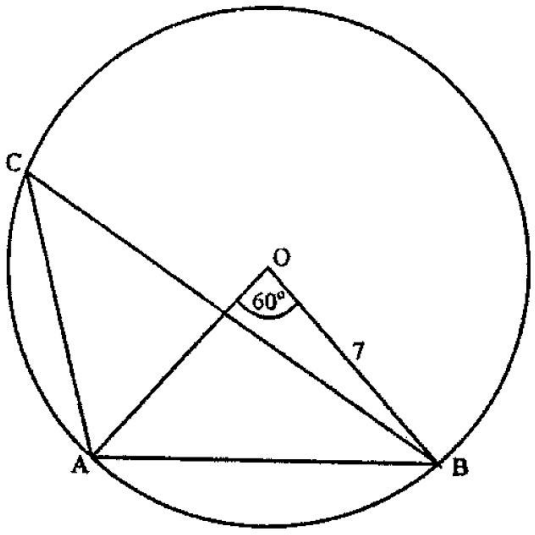
i) total distance covered in the 8 seconds,

(b)(i) ..... **[2]**

ii) acceleration of the athlete in the last 3 seconds.

(b)(ii) ..... **[2]**

23.



In the diagram points **A, B** and **C** are on the circumference of circle centre **O, OB** = 7cm and $A\hat{O}B = 60°$.

In this question take π to be $\frac{22}{7}$.

Calculate

a) $A\hat{C}B$,

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

b) $O\hat{A}B$,

(b) ..... **[1]**

c) the length of minor arc **AB**,

(c) ..... **[2]**

d) the area of the minor sector **AOB**.

(d) ..... **[2]**

24. It is given that the universal set , ξ, has subsets **P, S** and **M** such that,

$\xi = \{1;2;3;4;5;6;7;8;9\}$,

P = {prime numbers},

S = {perfect square numbers},

M = {multiples of 3}.

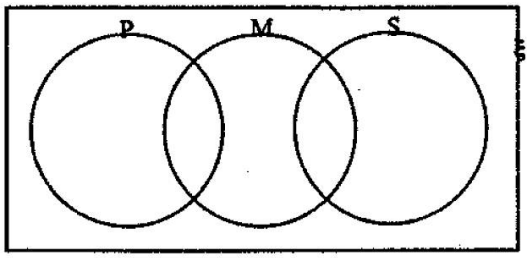
a) List all elements of set **P**.

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

b) Write down $n(P \cap S \cap M)$.

(b) ..... **[1]**

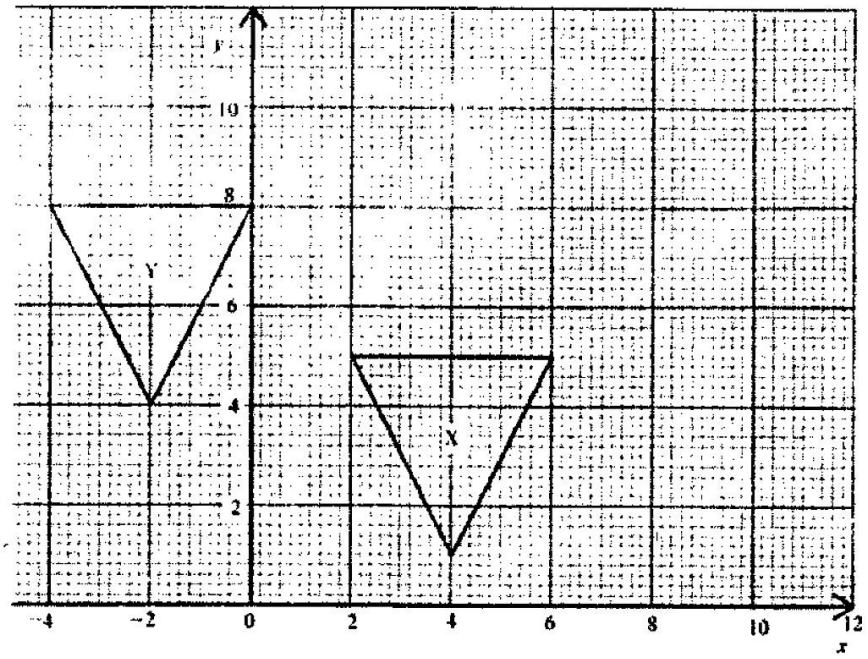
c) Complete the Venn Diagram by inserting elements in the correct regions



(c) ..... on the diagram **[3]**

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25.



The graph shows triangles X and Y.

a) Triangle Y is an image of triangle X under a certain single transformation.

Describe fully the single transformation which maps triangle X onto triangle Y.

Answer (a) .....

..... **[3]**

b) Triangle Z is the image of triangle X under an Enlargement of scale factor 2 and centre (0; 0).

i) State the matrix that represents the enlargement.

(b)(i) ..... **[2]**

ii) Draw and label triangle Z.

(b)(ii) ..... on the grid **[3]**

Total marks: 100