MARASHA E.

Candidate Name	Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

MATHEMATICS 4004/1

PAPER I

JUNE 2020 SESSION 2 hours 30 minutes

Candidates answer on the question paper

Additional materials:
Mathematical 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.
Time 2 hours 30 minutes

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 to three significant figures unless stated otherwise.
Mathematical tables, slide rules and calculators should **not** be brought 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.

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Answer all questions
NEITHER MATHEMATICAL TABLES NOR SLIDE RULES NOR CALCULATORS MAY BE USED IN THIS PAPER

1 Express 208,9

(a) in standard form,

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

(b) correct to 3 significant figures.

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

(c) correct to the nearest hundred.

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

2 Evaluate

(a) -10°,

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

(b) $\left(\frac{4}{9}\right)^{\frac{3}{2}}$.

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

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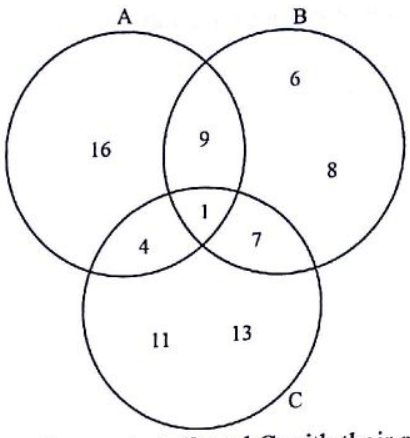

The Venn diagram shows three sets A, B and C with their respective elements.

(a) List all elements of

(i) $A \cap B$,

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

(ii) $(A \cup B)' \cap C$.

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

(b) Find $n(A \cup C)$.

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

4 **(a)** Solve the inequality $2 - y < 3y - 10$.

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

(b) The perfect square, y, satisfies both $2 - y < 3y - 10$ *and* $y \leq 9$
Find the possible values of y.

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

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5 Solve the simultaneous equations:

$2x + y = 4$

$x - y = -2$

Answer .....

..... [3]

6 **(a)** Convert 301_4 to a number in base 10.

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

(b) Evaluate

(i) $1101_2 + 111_2$, giving the answer in base 2,

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

(ii) $131_5 - 42_5$, giving the answer in base 5.

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

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7 The mean of 3 numbers is 7. Two of the numbers are 4 and –5.
Find the third number.

Answer ..... [3]

8 Given that $m = \frac{1}{2}$ and $n = -2$, evaluate

(a) $m - n$,

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

(b) $\frac{m\ n}{m\ +\ n}$.

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

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9 Express $\dfrac{2}{2 - 3n} - \dfrac{1}{n}$ as a single fraction in its simplest terms.

Answer ..... [3]

10 The matrix $\begin{pmatrix} (x+2) & 4 \\ 6 & x \end{pmatrix}$ is singular.

Find the possible values of x.

Answer ..... [3]

11 Given that $f(x) = \dfrac{k + x}{3x - 2}$ and that $f\left(-\dfrac{1}{3}\right) = \dfrac{1}{6}$,

find the value of k.

Answer ..... [3]

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12 It is given that $\mathbf{p} = \begin{pmatrix} 5 \\ 4 \end{pmatrix}$, $\mathbf{q} = \begin{pmatrix} -3 \\ 2 \end{pmatrix}$ and $\mathbf{r} = \begin{pmatrix} x \\ y \end{pmatrix}$.

Find

(a) $|p|$, leaving the answer in surd form,

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

(b) the value of x and the value of y if $\mathbf{p} - \mathbf{q} = 2\,\mathbf{r}$.

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

13 A salesman's total monthly salary consists of a basic salary of \$200 and a 2% commission on his monthly sales.
In one month his total salary was \$560.
Calculate

(a) his commission for that month,

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

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(b) the sales he made for that month.

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

14 It is given that $Sin\ y = \frac{5}{13}$ and that y is an acute angle.

Find as a common fraction,

(a) $Cos\ (180° - y°)$.

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

(b) $Tan\ y°$.

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

15 The table shows grades obtained by 150 candidates in a Mathematics test.

Grade	A	B	C	D	E	U
Frequency	5	25	30	29	21	40

(a) Find the median grade.

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

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(b) Calculate the probability that two candidates chosen at random from the 150 obtained grade A or B.

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

16 **(a)** Point R(–3; –2) is mapped onto point R_1 by a transformation represented by the matrix $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$.

Find the coordinates of R_1.

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

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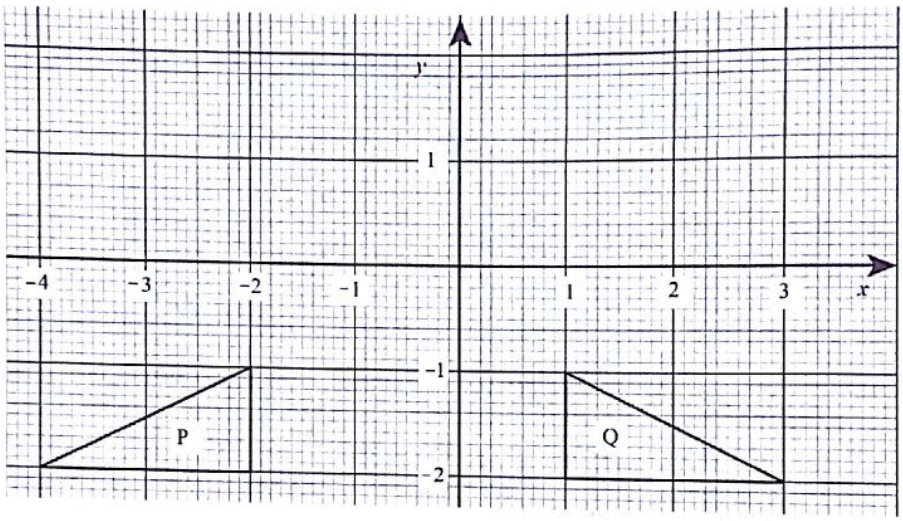
(b) In the diagram triangle P is the image of triangle Q under a certain transformation.

Describe fully the **single** transformation that maps triangle P onto triangle Q.



Answer (b) .....

..... [2]

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17 It is given that $g \propto \frac{m}{r}$ and $g = 1$ when $m = 2$ and $r = 3$.

Find the

(a) formula connecting g, m and r,

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

(b) numerical value of g when $m = 10$ and $r = 3$.

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

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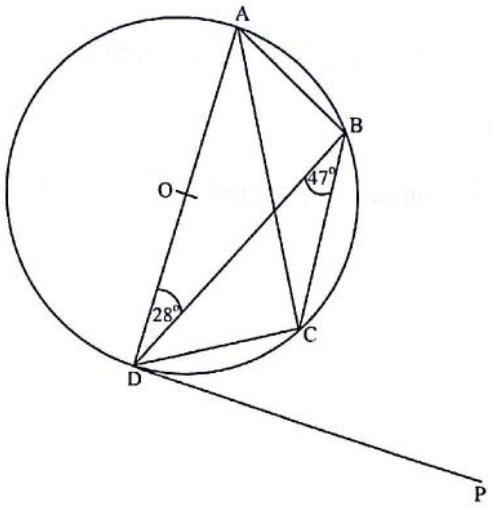

In the diagram A, B, C and D are points on the circumference of a circle centre O.
PD is a tangent to the circle at D, $A\hat{D}B = 28°$ and $C\hat{B}D = 47°$.

Calculate

(a) $B\hat{A}D$.

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

(b) $C\hat{D}P$.

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

(c) $C\hat{A}B$.

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

(d) $B\hat{C}D$.

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

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19 **(a)** Simplify $4b - 3(4 - 2b)$.

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

(b) Factorise completely
$x - y - xy + x^2$.

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

20 **(a)** Name the regular polygon which has rotational symmetry of order 5.

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

(b) The sum of the interior angles of a hexagon is 720°. Three of its interior angles are 140°, 120° and 160°.
The remaining angles are in the ratio 2 : 3 : 5.
Calculate the size of the largest of the remaining angles.

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

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21 It is given that $Log\ x = 6$ and $Log\ y = -2$.
Evaluate

(a) $Log\ (xy)$.

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

(b) $Log\left(\frac{1}{\sqrt{x}}\right)$.

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

22 On a certain map, a length of 2cm represents a distance of 5km.

(a) Express the scale of the map giving the answer in the form $1 : n$.

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

(b) Calculate the area on the map in cm^2 which represents an actual area of $4km^2$.

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

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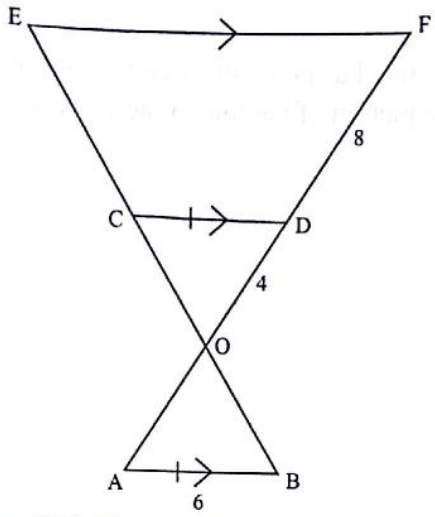
23



In the diagram AODF and BOCE are straight lines intersecting at O. AB is parallel to CD and EF,
AB = CD = 6cm, OD = 4cm and DF = 8cm.

(a) Name

(i) the triangle which is congruent to triangle AOB,

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

(ii) two triangles which are similar to triangle AOB.

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

(b) Calculate the length EF.

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

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24 **(a)** A straight line has gradient –1 and passes through the point (3; 0).
Find the equation of the line in the form $y = mx + c$.

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

(b) The solutions of a quadratic equation are $x = -1$ *and* $x = 3$.
Write down the quadratic equation in the form $ax^2 + bx + c = 0$
where a, b and c are integers.

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

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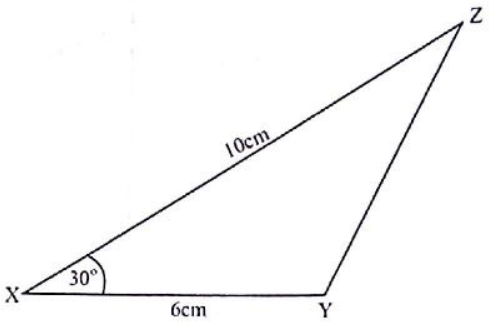
25



The diagram shows triangle XYZ with XY = 6cm, XZ = 10cm and $Y\hat{X}Z = 30°$.
Use as much of the information given below as is necessary.
$[Sin\ 30° = 0,50 :\ Cos\ 30° = 0,\ 87 :\ Tan\ 30° = 0,58]$
Calculate the

(a) area of the triangle XYZ,

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

(b) length of YZ leaving the answer in surd form.

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

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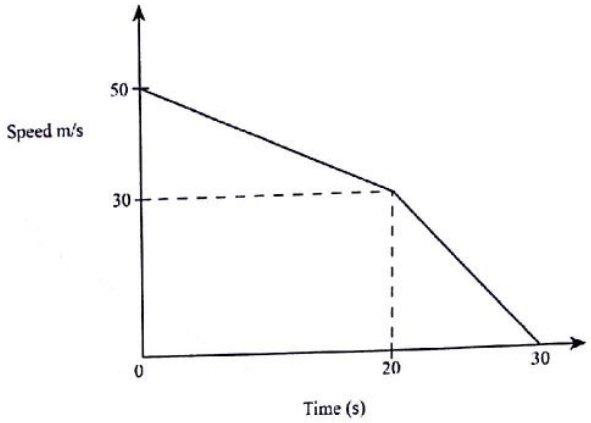

The diagram is a speed-time graph of an object which decelerates uniformly from a speed of 50 m/s to a speed of 30 m/s in 20 seconds. It further decelerates uniformly for 10 seconds until it comes to rest.

(a) Find the speed when $t = 5$ seconds.

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

(b) Calculate the

(i) acceleration of the object during the last 10 seconds.

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

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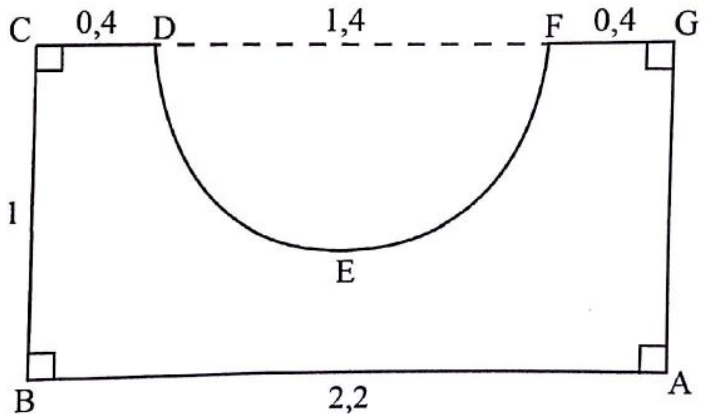
(ii) distance travelled during the 30 seconds.

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

.....

27



The diagram shows the cross-section of a concrete drinking trough which is 3m long. AB = 2,2m, BC = AG = 1m and CD = FG = 0,4m.
DF the diameter of the drinking trough is 1,4m. Take π to be $\frac{22}{7}$.

Calculate the

(a) perimeter of the cross-section,

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

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(b) area of the cross-section,

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

(c) volume of the concrete used to make the drinking trough.

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

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