Surname	Forename(s)	Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

MATHEMATICS 4004/1

PAPER 1

SPECIMEN PAPER 2 hours 30 minutes

Candidates answer on the question paper.
Additional materials:
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.

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 and your Centre number and Candidate number on the top right corner of every page of this paper.

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

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

1 **(a)** Find the value of $\frac{8}{0,04}$.

(b) Simplify $1\frac{1}{2} - \frac{4}{7}, \frac{2}{3}$ giving the answer as a fraction in its simplest form.

Answer (a) _____ [1]

(b) _____ [2]

2 Given that $p = -4$, $q = 3$ and $r = -1$, evaluate

(a) $\dfrac{p+q}{r}$,

(b) $\sqrt{p^2 q - r}$.

Answer (a) _____ [1]

(b) _____ [2]

3 In an athletics competition, under 20 boys compete in a 5 000 m race, while under 16 boys compete in a 3 000 m race.

(a) Calculate the difference in the distances they run giving the answer in standard form.

(b) A lap is 400 m long.

Find the number of laps in the 5 000 m race.

Answer (a) _____ [2]

(b) _____ [1]

4 It is given that $\overrightarrow{\boldsymbol{OP}} = \binom{-2}{7}$ and $\overrightarrow{\boldsymbol{OQ}} = \binom{12}{-5}$ where O is the origin.

(a) Express $\overrightarrow{\boldsymbol{PQ}}$ as a column vector.

(b) Find

(i) $\left|\overrightarrow{\boldsymbol{OQ}}\right|$,

(ii) the co-ordinates of M, the midpoint of PQ.

Answer (a) æ ö ç ÷ è ø [1]

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

(ii) (;) [1]

5 **(a)** Express $1 \times 3^3 + 2 \times 3^3 + 1 \times 3^1$ as a number in base 3.

(b) Convert 101_{10} to a number in base 9.

(c) Evaluate $203_7 - 154_7$ giving the answer in base 7.

Answer (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

6 Solve the simultaneous equations:

$$2x + 3y = 28$$
$$x + 5y = 35$$

Answer x = _____

y = _____ [3]

7 Solve the equation:

$$\frac{2y+5}{3y-2} = \frac{9}{4}$$

Answer y = _____ [3]

8 Make a the subject of the formula $\frac{1}{a} + \frac{1}{b} = 3$.

Answer _____ [3]

9 When baking scones, a baker mixes **six** cups of flour, **one** cup of sugar, **two** cups of water and **half** a cup of milk, together with other ingredients.

(a) Express the quantities of flour, sugar, water and milk as a ratio in its simplest form.

(b) Calculate the number of cups of water needed if the baker uses four cups of flour.

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

(b) _____ [2]

10 The probability that Sihle will bring a calculator is $\frac{5}{6}$ while that for Yemurai is $\frac{3}{5}$.

Giving the answer as a fraction in its simplest form, find the probability that,

(a) Sihle will **not** bring a calculator for the lesson,

(b) only one of them will bring a calculator for the lesson.

Answer *(a)* _____ [1]

(b) _____ [2]

11 **(a)** Write down the **special** name given to a polygon with five sides.

(b) State, for a regular five sided polygon, the

(i) number of lines of symmetry,

(ii) order of rotational symmetry.

Answer *(a)* _____ [1]

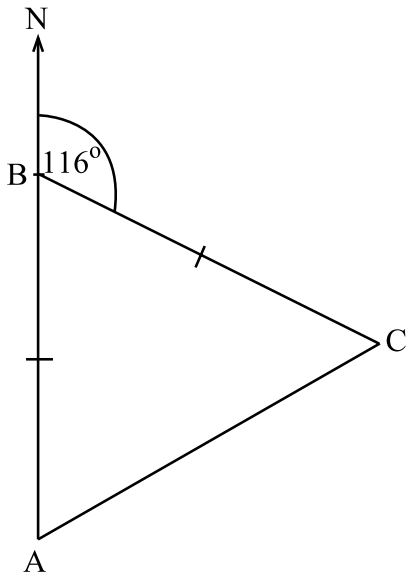
(b) *(i)* _____ [1]

(ii) _____ [1]

12 Solve the inequality $2 - x \leq 2x - 1 < 11$, giving the answer in the form $a \leq x < b$, where a and b are integers.

Answer $\leq x <$ _____ [3]

13



In the diagram, A, B and C are positions of 3 boreholes where BA = BC. The borehole at C has a bearing of 116° from the borehole at B.

Calculate

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

(b) the bearing of the borehole at A from the borehole at C.

Answer *(a)* $A\hat{C}B$ = _____ [1]

(b) _____ [2]

14 **(a)** If $\log_{10} 7 = 0{,}8451$, evaluate

(i) $\log_{10} 0{,}07$,

(ii) $\log_{10} 49$.

(b) Evaluate $\log_2 \left(\frac{1}{64}\right)$

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

(ii) _____ [1]

(b) _____ [2]

15 The table shows part of Ms Dube's payslip for a particular month.

Earnings	$	Deductions	$
transport allowance	100,00	pension contribution	6,00
housing allowance	129,00	union subscription	10,00
		medical aid	8,00
		Insurance	17,50
basic salary	275,00	total deductions	_____
net salary	_____		

(a) Calculate the

(i) total deductions,

(ii) net salary.

(b) Express the pension contribution as a percentage of her basic salary.

Answer *(a)* *(i)* $_____ [1]

(ii) $_____ [1]

(b) _____ % [2]

16 **(a)** Evaluate $81^{\frac{3}{4}}$.

(b) Find x if $9^{x-1} \times 3^{3x-2} = 3$.

Answer *(a)* _____ [2]

(b) $x =$ _____ [2]

17 Given that y is inversely proportional to $(x - 1)^2$ and that $y = 2$ when $x = 7$,

(a) express y in terms of x,

(b) calculate the values of x when $y = 8$.

Answer *(a)* $y =$ _____ [2]

(b) $x =$ _____ or _____ [2]

18 A luxury coach leaves Bulawayo for Harare every morning at 7.30 am and arrives in Harare at 1.00 pm.

(a) Express the departure time as a time in the 24 hour notation.

(b) Calculate the total time taken to travel from Bulawayo to Harare.

(c) Calculate the average speed of the bus to the nearest whole number if the distance from Bulawayo to Harare is 439 km.

Answer *(a)* _____ [1]

(b) _____ [1]

(c) _____km/h [2]

19 Factorise completely

(a) $cg - dg - ch + dh$,

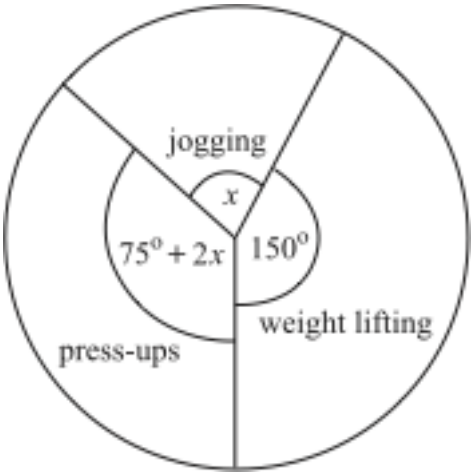
(b) $5d^2 - d - 4$.

Answer

(a) _____ [2]

(b) _____ [2]

20



The pie chart shows the distribution of an athlete's daily exercise programme.

(a) Calculate the value of x.

(b) If the athlete spent 18 minutes jogging, calculate the

(i) time she spent on weight lifting,

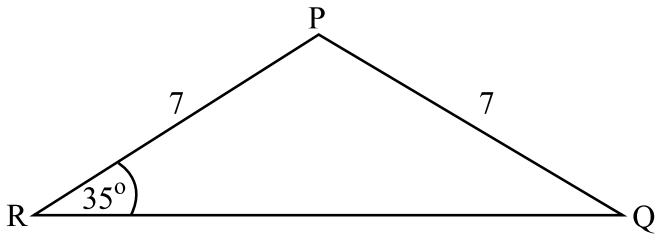
(ii) total time spent exercising.

Answer *(a)* x = _____ [1]

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

(ii) _____ [2]

21



In the diagram, PQR is an isosceles triangle such that PQ = PR = 7 cm and $P\hat{R}Q = 35^{o}$.

Using as much of the information given below as is necessary, calculate

(a) QR,

(b) the area of triangle PQR.

$$\begin{bmatrix} \mathbf{\sin 35^{o} = 0,57} & \mathbf{\cos 35^{o} = 0,82} & \mathbf{\tan 35^{o} = 0,70} \\ \mathbf{\sin 70^{o} = 0,94} & \mathbf{\cos 70^{o} = 0,34} & \mathbf{\tan 70^{o} = 2,75} \end{bmatrix}$$

Answer *(a)* _____cm [2]

(b) _____cm^2 [2]

22 It is given that, the universal set ξ has subsets P, Q and R such that

$\xi = \{x : 31 \leq x < 37 \text{ and } x \text{ is an integer}\}$

$P = \{x : x \text{ is a multiple of } 3\}$,

$Q = \{x : x \text{ is a factor of } 99\}$ and

$R = \{x : x \text{ is a prime number}\}$.

(a) List all the elements of R.

(b) Write down $n(P \cap R)'$.

(c) List all elements of $(P \cap Q \cap R)'$.

Answer *(a)* _____ [1]

(b) _____ [1]

(c) _____ [2]

23 A map is drawn to a scale of 1: 75 000.

(a) Calculate in km the actual distance between two towns which are 40 cm apart on the map.

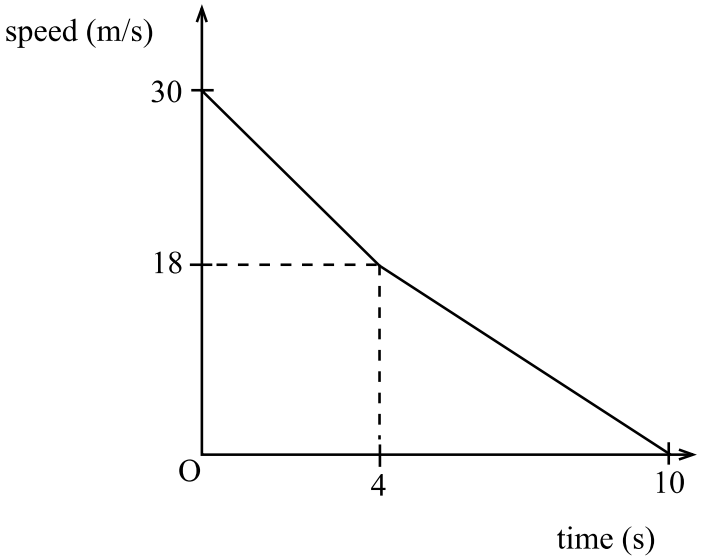
(b) An airport has an actual area of 22,5 km^2.

Calculate in cm^2 the area of the airport on the map.

Answer *(a)* _____ km [2]

(b) _____ cm^2 [2]

24



In the diagram, a moving object decelerates from a speed of 30 m/s to a speed of 18 m/s in 4 seconds and further decelerates from a speed of 18 m/s to rest after a further 6 seconds.

Calculate the

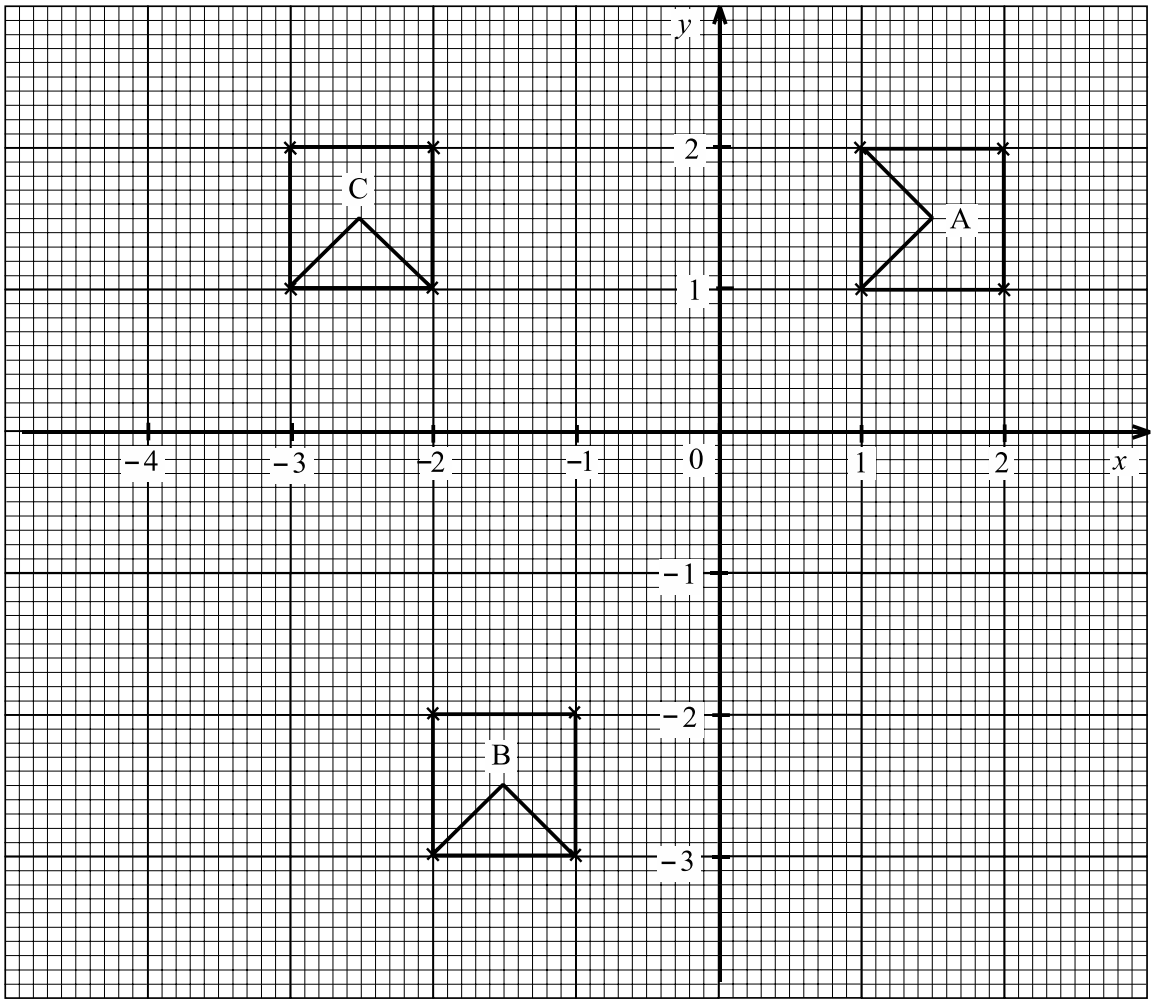
(a) speed of the object after the first 2 seconds,

(b) total distance covered by the object in the 10 seconds.

Answer *(a)* _____ m/s [2]

(b) _____ m [2]

25



The diagram shows three shapes A, B and C on a Cartesian plane.

(a) Describe completely the single transformation which maps shape A onto shape B.

(b) Shape B is mapped onto shape C by a transformation P. Describe fully the transformation P.

Answer *(a)* _____

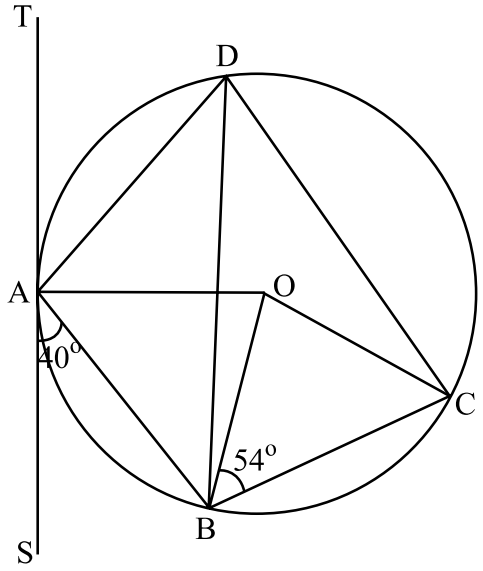
_____

_____ [3]

(b) _____

_____ [2]

26



In the diagram, O is the centre of the circle. TAS is a tangent to the circle at A, $B\hat{A}S = 40°$ and $O\hat{B}C = 54°$.

Calculate,

(a) $O\hat{A}B$,

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

(c) $A\hat{D}C$,

(d) reflex $A\hat{O}C$.

Answer *(a)* $O\hat{A}B$ = _____ [1]

(b) $A\hat{O}B$ = _____ [1]

(c) $A\hat{D}C$ = _____ [2]

(d) reflex $A\hat{O}C$ = _____ [2]

27 If $\mathbf{F} = \begin{pmatrix} 3 & x \\ -4 & -6 \end{pmatrix}$, $\mathbf{G} = \begin{pmatrix} 3 & -2 \\ 2 & -1 \end{pmatrix}$ and $\mathbf{H} = \begin{pmatrix} 7 \\ 1 \end{pmatrix}$,

find

(a) $\mathbf{F} + 3\mathbf{G}$ in terms of x,

(b) the value of x if the determinant of $\mathbf{F}$ is -14,

(c) **GH.**

Answer *(a)* _____ [2]

(b) _____ [2]

(c) _____ [2]