Candidate Name	Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

MATHEMATICS
PAPER 1

4004/1
2 hours 30 minutes

NOVEMBER 2024 SESSION

Additional materials:
Mathematical Instruments

INSTRUCTIONS TO CANDIDATES

Write your Name, Centre number and Candidate number in the spaces at the top of each page.
Check that all the pages are in the booklet and ask the invigilator for a replacement if there are duplicate or missing pages.
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.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.
This paper is marked out of **100**.

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 0, 09874

(a) **(i)** correct to the nearest tenth,

Answer (a)(i)

[1]

(ii) correct to 2 significant figures,

Answer (a)(ii)

[1]

(b) in standard form.

Answer (b)

[1]

2 **(a)** Express 1 225 as a product of its prime factors in index form.

Answer (a)

[2]

(b) Hence or otherwise find $\sqrt{1\ 225}$.

Answer (b)

[1]

3 Kate, James and Jack shared \$3 042 in the ratio 4 : 3 : 2 respectively.
Find how much Kate got more than Jack.

Answer

[3]

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4 In a school, lessons start at quarter to 8 in the morning and end at 3. 15 pm.

(a) Express 3. 15 pm in 24 hour notation.

Answer (a) .....

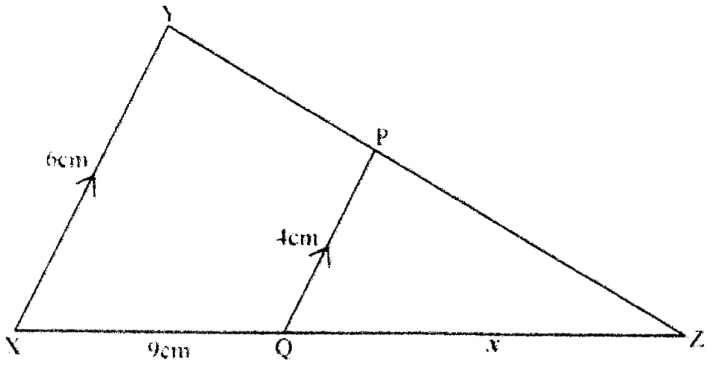
[1]

(b) Find total time for lessons on each day.

Answer (b) .....

[2]

5



XQZ and YPZ are straight lines meeting at Z.

XY and QP are parallel.

$XY = 6\ cm,\ QP = 4\ cm$ and $XQ = 9\ cm$. QZ = x cm.

(a) Name two triangles that are similar.

Answer (a)

[1]

(b) Hence find the length of QZ.

Answer (b)

[3]

6 The table below shows the number of learners in each age group of a class.

Age (years)	13	14	15
Number of learners	9	26	5

Use the table to find the

(a) total number of learners in the class.

Answer (a)

[1]

(b) probability that a learner chosen at random is 13 years old.

Answer (b)

[1]

(c) probability that if two learners are chosen at random, the first is aged 13 years and the second is aged 15 years.

Answer (c)

[2]

7 **(a)** Find vector $\vec{p}$ such that $\begin{pmatrix}1\\3\end{pmatrix} - \vec{p} = \begin{pmatrix}9\\-3\end{pmatrix}$.

Answer (a)

[2]

(b) Hence find $|\vec{p}|$, the magnitude of vector p.

Answer (b)

[2]

8 **(a)** Solve the inequality $3x - 2 < 10 + x < 5x + 2$ giving the answer in the form $a < x < b$, where a and b are numbers.

Answer (a)

[3]

(b) Hence find a perfect square number which satisfies the given inequality.

Answer (b)

[1]

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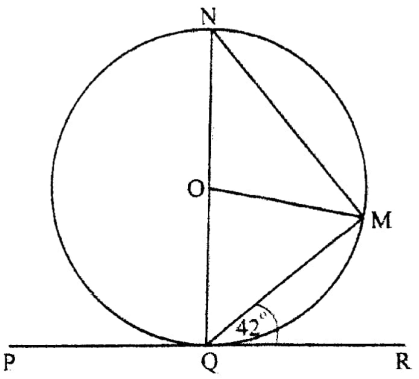
8

9



M, N and Q are three points on the circumference of circle O and diameter QN.
PR is a tangent to the circle at Q. Given that $M\hat{Q}R = 42°$.
Find

(a) $Q\hat{N}M$,

Answer (a)

[1]

(b) $Q\hat{M}N$,

Answer (b)

[1]

(c) $M\hat{O}Q$.

Answer (c)

[2]

10 A cylindrical floor polish tin is 14cm in diameter and 5cm deep.
In this question take π to be $3\frac{1}{7}$.

(a) Calculate the volume of the tin.

Answer (a)

[2]

(b) When full the tin contains 840g of floor polish.
Calculate the density of the polish in g/cm^3 to 2 decimal places.

Answer (b)

11 **(a)** Express 2,35 hours in hours and minutes. [2]

Answer (a)

[1]

(b) Simplify $413_5 + 1011_2$ giving the answer in base ten.

Answer (b)

[3]

12 A map is drawn to a scale of 1cm to 5 kilometres.

(a) Express the scale in the form 1 : n

Answer (a)

[1]

(b) Find the actual distance in kilometres between two points which are 3,6 cm apart on the map.

Answer (b)

[2]

(c) If the actual area of a city is 125 km^2 , find the area of the city on the map .

Answer (c)

[2]

13 y varies jointly as the square of x and directly with z. When $x = 2$ and $z = 3$, $y = 4\frac{1}{2}$.

(a) Find the relationship between y, x and z.

Answer (a)

[2]

(b) Find y when $x = 5$ and $z = 4$.

Answer (b)

[3]

14 Given that $f(x) = 2^{3x-1}$

find

(a) f(1),

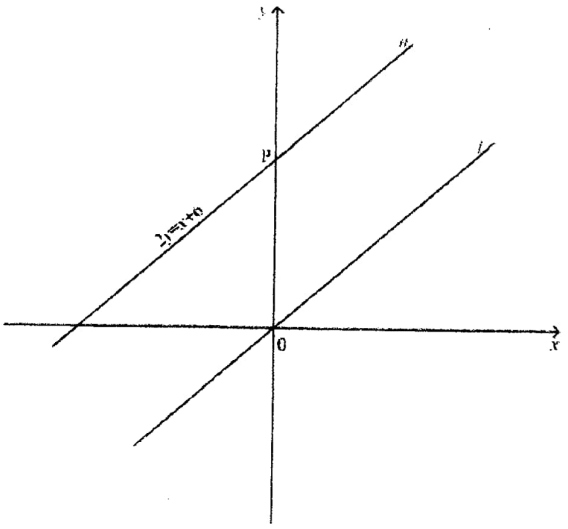
Answer (a)

(b) the value of x for which f(x) = 32. [2]

Answer (b)

[3]

15



Line n passing through point P has equation $2y = x + 6$.
Line l passes through the origin and is parallel to line n.
Find the

(a) distance OP.

Answer (a)

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[3]

(b) equation of line l

Answer (a)

[2]

16 **(a)** Express $\frac{2}{a} - \frac{5}{2-5a}$ as a single fraction in its simplest form.

Answer (a)

[3]

(b) Given that $a = 1$, $b = 0$ and $c = -2$, evaluate $\frac{b-c}{3a}$.

Answer (b)

[2]

17 Three towns X, Y and Z are on level ground such that Y is $8km$ to the east of X. Z is due south of Y. Z is on a bearing of $S60°E$ and $10km$ from X.

(a) Find the

(i) three figure bearing of Z from X

Answer (a)(i)

[1]

(ii) compass bearing of X from Z

Answer (a)(ii)

[1]

(b) Calculate the distance that Z is south of Y.

Answer (b)

[3]

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18 Matrix $A = \begin{pmatrix} 2 & 4 \\ -1 & 3 \end{pmatrix}$, Matrix $B = \begin{pmatrix} 0 & -4 \\ 2 & -6 \end{pmatrix}$

(a) Simplify $A + \frac{1}{2}B$.

Answer (a)

[2]

(b) Find the inverse of matrix B .

Answer (b)

[3]

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19 The table below shows the number of children in a hospital by age.

Age (years)	1	2	3	4	5	6	7	8
Number of children	3	4	5	6	7	6	5	4

(a) Use the table to find the

(i) modal age of the children.

Answer (a)(i)

[1]

(ii) number of children in the hospital.

Answer (a)(ii)

[2]

(b) Calculate the mean age of the children.

Answer (b)

[3]

20 Solve the equations:

(a) $2(3x - 1) - 10 = 0$

Answer (a)

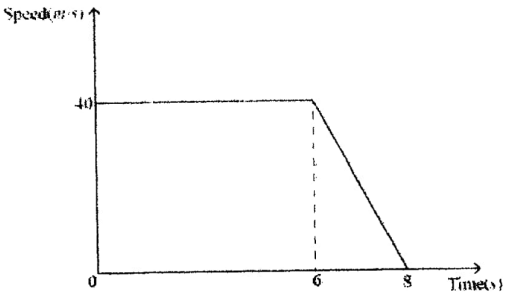
[2]

(b) $(x - 2)^2 = \frac{1}{4}$

Answer (b)

[4]

21



The speed - time graph shows how an object travels at a constant speed of 40m/s in 6 seconds and then slows down uniformly, coming to rest after 2 seconds.
Use the graph to calculate the

(a) uniform deceleration of the object in the last 2 seconds.

Answer (a)

[2]

(b) distance travelled by the object in the 8 seconds.

Answer (b)

[2]

(c) average speed of the object during the 8 seconds.

Answer (c)

[2]

22 The universal set ξ, has subsets A and B such that;

$\xi = \{3; 6; 9; 12 \ldots ; 30\}$

A = { numbers less than 20 }

B = { factors of 30 }.

(a) List the elements of set A.

Answer (a)

[2]

(b) Find $n(B^{l})$

Answer (b)

[2]

(c) Represent the sets A, B and ξ on a clearly labelled Venn diagram.

Answer (c)

[3]