Candidate Name	Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

MATHEMATICS 4008/1, 4028/1

PAPER 1

JUNE 2008 SESSION 2 hours 30 minutes

Candidates answer on the question paper.
Additional materials:
Geometrical instruments

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.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.
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.

FOR EXAMINER'S USE

This question paper consists of 24 printed pages.

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

For Examiner's Use

1 (a) Express 0,000 0526 in standard form.

(b) Estimate by first rounding off each number to one significant figure, the value of $\frac{3{,}04 \times 1{,}98 - 9{,}48}{2{,}91}$.

Answer (a) _____ [1]

(b) _____ [2]

For Examiner's Use

2 Express

(a) 5,3 km^2 in hectares,

(b) 20 litres in cubic centimetres,

(c) 408 hours in weeks and days.

Answer *(a)* _____ ha [1]

(b) _____ cm^3 [1]

(c) _____ weeks _____ days [1]

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3 (a) Find the value of the base y such that $6703_y - 725_y = 5756_y$.

(b) Convert 134_5 to a number in base two.

Answer *(a)* _____ [1]

(b) _____ [2]

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4 In a shop one loaf of bread cost \$65 000.

For Examiner's Use

(a) Find

(i) the cost of a dozen loaves of bread;

(ii) the number of loaves of bread that could be bought for \$4 550 000.

(b) Write down the type of variation which connects the cost of bread and the number of loaves of bread bought.

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

(ii) _____ [1]

(b) _____ variation [1]

For Examiner's Use

5 (a) Write down **one** capital letter of the alphabet which has rotational symmetry of order 2 but no line of symmetry.

(b) The mean of m, p, q and r is 8,25.
The mean of m, n, p, q and r is 4,6.
Find the value of n.

Answer (a) _____ [1]

(b) _____ [2]

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6 The radius, r cm, of a circle is given as 9 cm, correct to the nearest whole number.

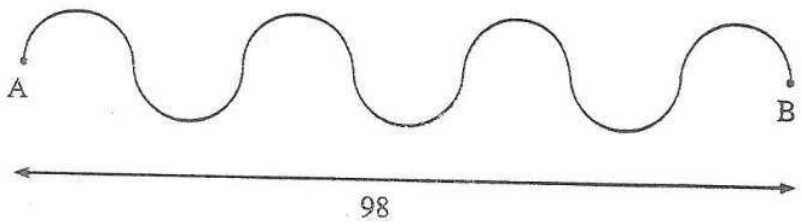
(a) Write down the limits between which r must lie.

(b) Calculate the least possible circumference of the circle, giving your answer in terms of π.

Answer (a) _____ [1]

(b) _____ cm [2]

7



The diagram shows a pattern which is made up of identical semi-circular arcs. The shortest distance between the ends A and B is 98 cm.

Calculate

(a) the diameter of each semi-circle,

(b) the distance from A to B along the curves.

$$\left(\textbf{Take } \pi = \frac{22}{7}\right)$$

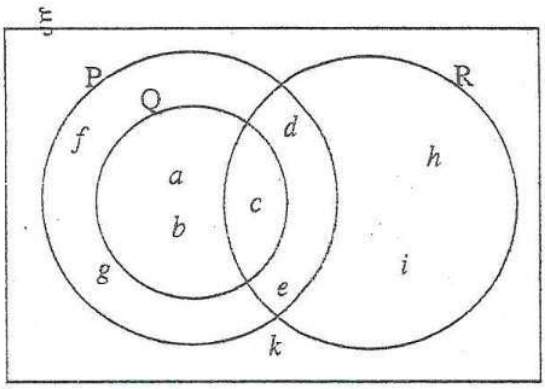
For Examiner's Use

Answer *(a)* _____ cm [1]

(b) _____ cm [2]

For Examiner's Use

8



The Venn diagram shows the universal set, ξ and the sets P, Q and R with their members.

(a) From the venn diagram, list the members of

(i) $P \cap Q$,

(ii) $P' \cap Q'$.

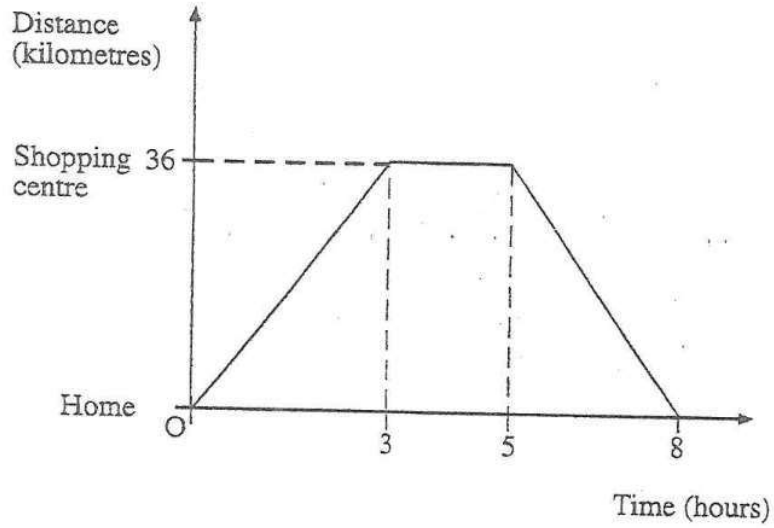
(b) Find n(P).

Answer (a) (i) $P \cap Q =$ _____ [1]

(ii) $P' \cap Q' =$ _____ [1]

(b) $n(P) =$ _____ [1]

9



The diagram is the distance-time graph of a cyclist who goes out shopping and returns home.

Calculate

(a) the time spent at the shopping centre,

(b) the average speed for the whole journey.

Answer (a) _____ hours [1]

(b) _____ km/h [2]

10 A bag contains 60 identical marbles, except for colour. 36 are green, x are red and the rest are blue.

For Examiner's Use

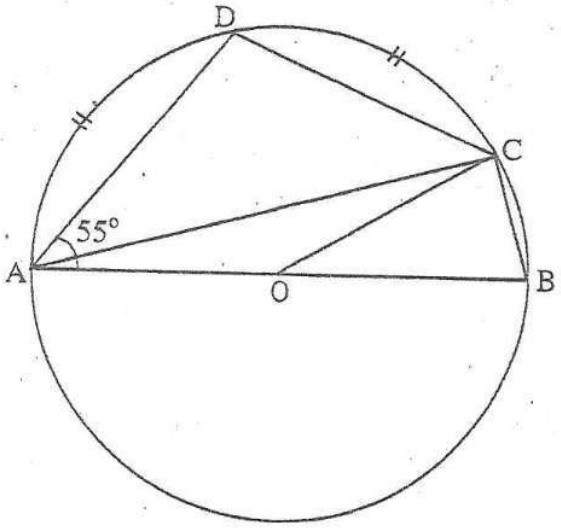
(a) If the probability of selecting a red marble at random is $\frac{1}{3}$, find x.

(b) Two marbles are drawn, one after the other, with replacement. Find the probability that neither marble is green, giving your answer as a common fraction in its lowest terms.

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

(b) _____ [2]

11



In the diagram ABCD is a circle centre O. Arc AD = arc DC, $D\hat{A}O = 55°$ and AOB is a straight line.

Calculate

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

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

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

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

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

(c) $D\hat{A}C =$ _____ [1]

For Examiner's Use

12 Evaluate

(a) $(-32)^{\frac{3}{5}}$,

(b) $\frac{1}{5^{-3}}$.

Answer *(a)* _____ [2]

(b) _____ [2]

13 Factorise completely

(a) $15m + 18 - 10mn - 12n$,

(b) $27x^2 - 12y^2$

Answer *(a)* _____ [2]

(b) _____ [2]

For Examiner's Use

14 The following is an extract of Mr Dube's telephone bill for the month of January 2002. x is the number of units used and y is the Value Added Tax (VAT).

DATE	ACCOUNT DETAILS	AMOUNT
31 Jan 2002	Rental from 01/02/02 to 28/02/02	140,00
	Metered units 02781 01685 (x units)	2 192,00
	Sub Total	2 332,00
	VAT @ 15.0%	y
	Amount Due	

(a) Find,

(i) the units used, x

(ii) the cost per unit.

(b) Calculate the Value Added Tax, y.

Answer (a) (i) _____ [1]

(ii) $ _____ [2]

(b) $ _____ [1]

15 (a) A triangle has sides of length 7 cm, 15 cm and x cm. If x is an integer, find

For Examiner's Use

(i) the minimum value of x,

(ii) the maximum value of x.

(b) The sum of the interior angles of an irregular polygon is 5040°. Find the number of sides of the polygon.

Answer (a) (i) minimum $x =$ _____ [1]

(ii) maximum $x =$ _____ [1]

(b) _____ [2]

For Examiner's Use

16 The selling price of school shoes at a departmental store in January 2005 was $750 000 per pair.

(a) Calculate the amount paid for one pair of school shoes if a 10% discount was allowed.

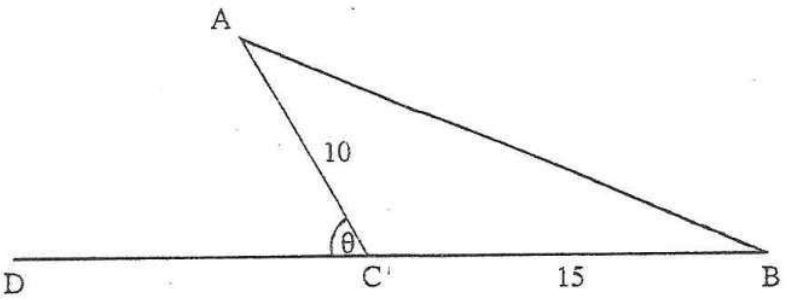
(b) In February 2005 the price rose by 15%. Calculate the new selling price of one pair of school shoes.

Answer (a) $ _____ [2]

(b) $ _____ [2]

For Examiner's Use

17



In the diagram DCB is a straight line. BC = 15 cm, AC = 10 cm and $A\hat{C}D = \theta$.

Given that $\sin\theta = \frac{3}{5}$, find

(a) $\cos\theta$,

(b) the area of ΔABC.

Answer *(a)* $\cos\theta =$ _____ [2]

(b) _____ cm^2 [2]

For Examiner's Use

18 Bulawayo and Harare are 400 km apart by air.

A helicopter leaves Bulawayo at 2.30 p.m. and arrives in Harare at 4.10 p.m. on the same day. Calculate

(a) the average speed of the helicopter,

(b) the arrival time in Bulawayo in the 24-hour clock on the return journey if the helicopter leaves Harare at 10.36 p.m. and takes 1 hour 49 minutes.

Answer (a) _____ km/h [2]

(b) _____ [2]

For Examiner's Use

19 It is given that $\mathbf{p} = \begin{pmatrix} 6 \\ -4 \end{pmatrix}$ and $\mathbf{q} = \begin{pmatrix} -15 \\ y \end{pmatrix}$.

(a) Calculate $|\mathbf{p}|$, leaving your answer in surd form.

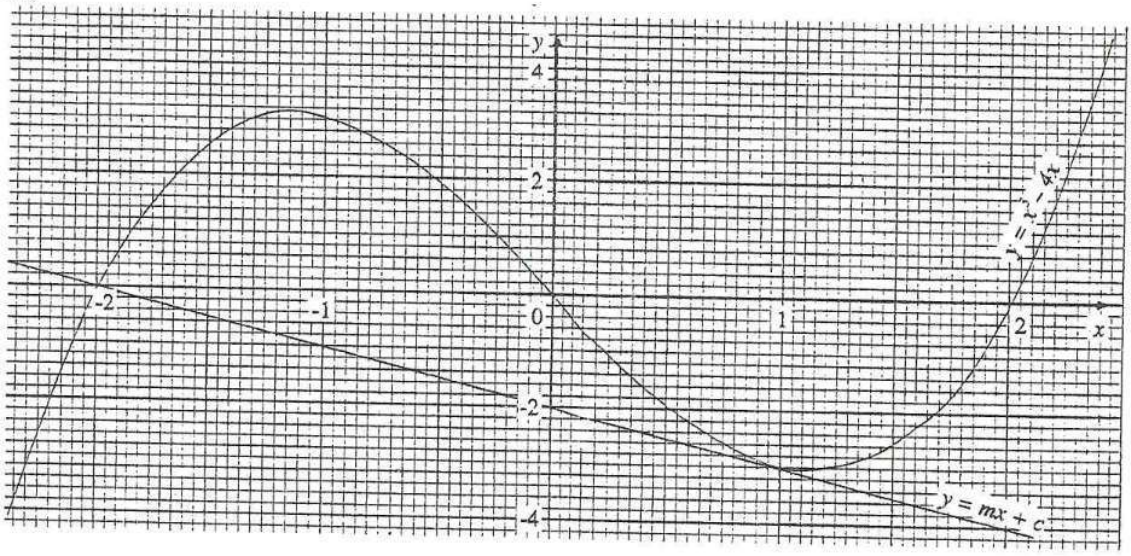
(b) If $\mathbf{p}$ is parallel to $\mathbf{q}$, calculate the value of y.

Answer (a) _____ [2]

(b) _____ [2]

For Examiner's Use

20



In the diagram the line $y = mx + c$ touches the curve $y = x^3 - 4x$ at $(1; -3)$.

Write down

(a) the value of c,

(b) the value of m,

(c) the gradient of $y = x^3 - 4x$ when $x = 1$,

(d) the range of values of x for which $mx + c > x^3 - 4x$.

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

(b) m = _____ [1]

(c) _____ [1]

(d) _____ [1]

For Examiner's Use

21 It is given that $\mathbf{M} = \begin{pmatrix} 2x & x \\ x & 2x \end{pmatrix}$.

(a) Find $\mathbf{M}^2$ in terms of x.

(b) Find x given also that $|\mathbf{M}| = 48$.

Answer (a) $\mathbf{M}^2 =$ _____ [2]

(b) $x =$ _____ or _____ [3]

For Examiner's Use

22 It is given that y varies inversely as $x+4$.

(a) Express y in terms of x and a constant k.

(b) Given also that $x=6$ when $y=2$, find the value of k.

(c) Find the value x when $y=8$.

Answer (a) $y =$ _____ [1]

(b) $k =$ _____ [2]

(c) $x =$ _____ [2]

For Examiner's Use

23 (a) At a certain party the ratio *men*: *women*: *children* was 5: 6: 4. If there were 80 children at the party, calculate the total number of people at the party.

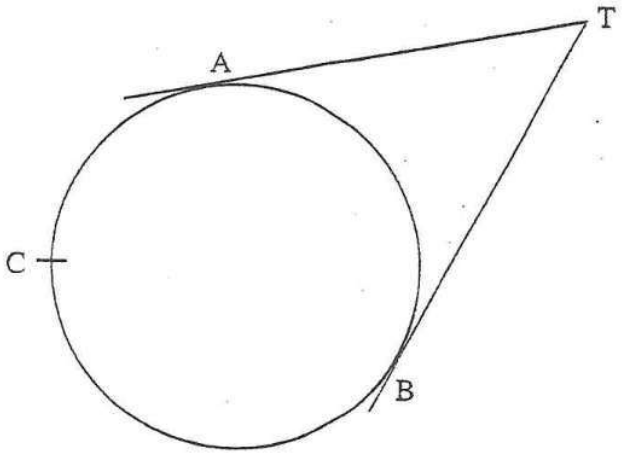
(b) The area of a certain country is given as $8{,}5 \times 10^6$ km^2. The area of the country's map is given as $3{,}4 \times 10^5$ cm^2. Find, in the form 1: n, the scale used in drawing the map.

Answer (a) _____ [2]

(b) _____ [3]

24

For Examiner's Use



In the diagram TA and TB are tangents to the circle ABC.

(a) Using a ruler and compasses only, construct

(i) the locus of points equidistant from A and C,

(ii) the locus of points equidistant from AT and BT.

(b) Write down the radius of the circle.

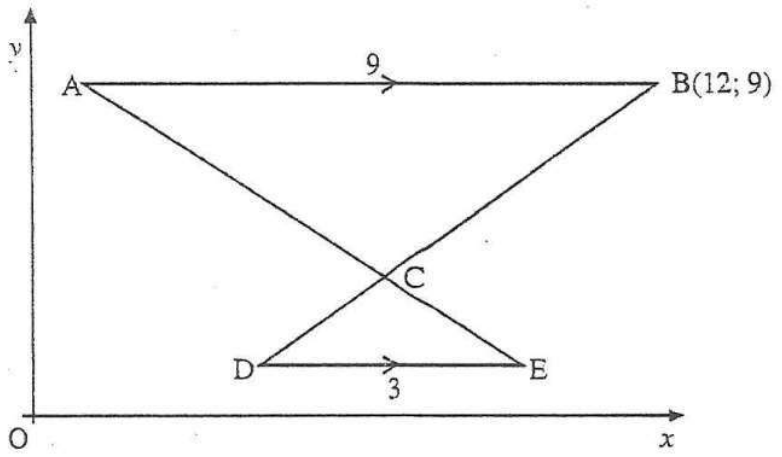
Answer *(a)* *(i)* on diagram. [2]

(ii) on diagram. [2]

(b) _____ cm [1]

25

For Examiner's Use



In the diagram ACE and BCD are straight lines. AB is parallel to DE, AB = 9 cm, BC = 3 cm and B is the point (12; 9).

(a) Describe **fully** the **single** transformation which maps ΔABC onto ΔEDC.

(b) ΔABC is mapped onto ΔA′B′C′ by a transformation represented by the matrix $\begin{pmatrix} 2 & 0 \\ 0 & 3 \end{pmatrix}$. Calculate the coordinates of B′.

Answer *(a)* _____

_____

_____ [3]

(b) (_____, _____) [2]

For Examiner's Use

26 Given that log2 = 0,3010 and log 3 = 0,4771, calculate

(a) log6,

(b) log1,5,

(c) $\log\sqrt{2}$.

Answer *(a)* log6 = _____ [2]

(b) log1,5 = _____ [2]

(c) $\log\sqrt{2}$ = _____ [2]

24	(a)	(i)	Perpendicular bisector	2
		(ii)	Bisector of $A\hat{T}B$	2
	(b)	$2,6 \pm 0,2$		1
25	(a)	Enlargement with centre		3
	(b)	B^1 924; 27)		2
26	(a)	0,7781		2
	(b)	0,1761		2
	(c)	0,1505		2