Surname	Forename(s)	Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

MATHEMATICS 4008/1

PAPER 1

JUNE 2014 SESSION 2 hours 30 minutes

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

Allow candidates 5 minutes to count pages before the examination.

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.

FOR EXAMINER'S USE

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Centre Number	Candidate's Number

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

1 Express 2046,489 correct to

(a) the nearest ten,

(b) 2 decimal places,

(c) 2 significant figures.

Answer: *(a)* _____ [1]

(b) _____ [1]

(c) _____ [1]

Centre Number	Candidate's Number

2 Evaluate, giving your answers as common fractions in their lowest terms

(a) $\frac{3}{5}+\frac{1}{7}$,

(b) $\frac{5}{8}\times\frac{32}{45}$,

(c) $\frac{5}{24}\div\frac{1}{3}$.

Answer: *(a)* _____ [1]

(b) _____ [1]

(c) _____ [1]

Centre Number	Candidate's Number

3 Giving your answer as a decimal, find the exact value of

(a) $0{,}175 - 0{,}049$,

(b) $\sqrt{0{,}0144}$,

(c) $(0{,}06)^2$.

Answer: *(a)* _____ [1]

(b) _____ [1]

(c) _____ [1]

Centre Number	Candidate's Number

4 **(a)** Expand $(2a-b)(1+c)$.

(b) Simplify $\dfrac{m^2-mn}{n^2-np} \div \dfrac{m}{(n-p)}$.

Answer: *(a)* _____ [2]

(b) _____ [1]

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5 It is given that

$\xi = \{30; 31; 32; 33; 34; 35; 36; 37; 38; 39\}$,

A is the set of odd numbers and
B is the set of prime numbers.

(a) List the elements of

(i) A,

(ii) B^1.

(b) Find $n(A \cap B^1)$.

Centre Number	Candidate's Number

Answer: *(a)* *(i)* {_____} [1]

(ii) {_____} [1]

(b) _____ [1]

Centre Number	Candidate's Number

6 **(a)** State the special type of a triangle which has one line of symmetry.

(b) A polygon has n sides. Two of its exterior angles are 55° and 45°. The remaining $(n - 2)$ exterior angles are each 20°.

Calculate the value of n.

Answer: *(a)* _____ [1]

(b) $n =$ _____ [2]

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7 **(a)** Express 9 minutes after midnight as time on the 24 hour clock.

(b) In 1998 the population of a village was $2{,}8 \times 10^2$. In 2004, the population was $3{,}5 \times 10^2$.

Calculate the percentage increase of the population from 1998 to 2004.

Answer: *(a)* _____ [1]

(b) _____ [2]

Centre Number	Candidate's Number

8 Solve the simultaneous equations

$$\frac{1}{3}x = y,$$

$$2x + y = -7.$$

Answer: $x =$ _____

$y =$ _____ [3]

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9 **(a)** Given that $f(x) = (x-1)(x+6)$ and that $f(0) = p$, find the value of p.

(b) If $yk = ax - bk$, make k the subject of the formula.

Answer: *(a)* $p =$ _____ [1]

(b) $k =$ _____ [2]

Centre Number	Candidate's Number

10 **(a)** Express $3^4 + 3^2 + 3$ as a number in base 3.

(b) Evaluate

(i) $143_8 + 57_8$ giving your answer in base 8,

(ii) $4_5 - 2_3 + 1_2$ giving your answer in base 10.

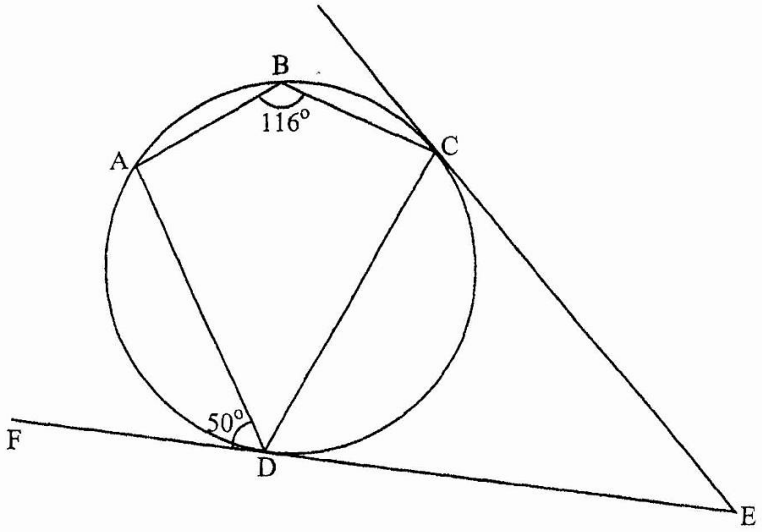
Answer: *(a)* _____ [1]

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

(ii) _____ [1]

Centre Number	Candidate's Number

11



In the diagram, ABCD is a circle. Tangents at C and D meet at E and ED is produced to F such that $A\hat{D}F = 50°$ and $A\hat{B}C = 116°$.

Calculate

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

(b) $C\hat{D}E$,

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

Answer: *(a)* _____ [1]

(b) _____ [1]

(c) _____ [1]

Centre Number	Candidate's Number

12 The cost of making a telephone call on Teneco is 25 cents per minute.
Kuda has p cents and is able to make a call.

Xolani has q cents which is insufficient to make a call. Write down 3 inequalities in terms of p and/or q, other than $p > 0$ and $q > 0$, that satisfy the given conditions.

Answer: *(i)* _____ [1]

(ii) _____ [1]

(iii) _____ [1]

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13 AB is a line whose equation is $6y = 7x + 48$.

Find

(a) the gradient of line AB,

(b) the equation of the line parallel to AB which passes through the point (3; 1), giving your equation in the form $ay + bx + c = 0$.

Answer: *(a)* _____ [1]

(b) _____ [2]

Centre Number	Candidate's Number

14 **(a)** Given that $4m = 7n$, find the ratio $m : n$.

(b) A holiday trip to South Africa cost R333. If the exchange rate was US$1 to R8, calculate the cost of the trip in US$, giving your answer to the nearest cent.

Answer: *(a)* _____ [1]

(b) US$_____ [2]

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15 Factorise completely

$3x^3y - 12xy^3$.

Answer: _____ [3]

Centre Number	Candidate's Number

16 Solve the equation

$$\left(y+\frac{1}{4}\right)^2=\frac{9}{16}.$$

Answer: $y =$ _____ or _____ [3]

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17 **(a)** Simplify $\left(32x^{10}\right)^{\frac{1}{5}}$.

(b) Given that $\frac{2^{-2}\times 2^{c}}{2^{4}}=2^{3}$, find the value of c.

Answer: *(a)* _____ [2]

(b) $c =$ _____ [2]

Centre Number	Candidate's Number

18 It is given that $\mathbf{P} = \begin{pmatrix} 2 & 1 \\ 1 & 1 \end{pmatrix}$ and $\mathbf{Q} = 2\mathbf{P} - \mathbf{I}$ where $\mathbf{I}$ is the identity matrix.

Find

(a) $\mathbf{P}^{-1}$,

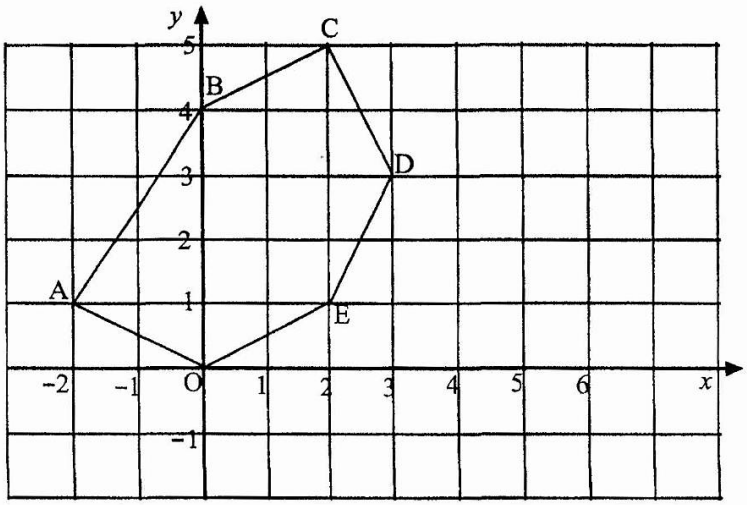
(b) $\mathbf{Q}$.

Answer: *(a)* _____ [2]

(b) _____ [2]

Centre Number	Candidate's Number

19



In the diagram, OABCDE is a hexagon.

(a) Express as column vectors

(i) $\overrightarrow{OE}$,

(ii) $\overrightarrow{OA} + \overrightarrow{AD}$.

(b) Describe **fully** the **single** transformation which maps side BC onto side OE.

Answer: *(a)* *(i)* $\overrightarrow{OE} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(ii) $\overrightarrow{OA} + \overrightarrow{AD} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(b) _____

_____ [2]

Centre Number	Candidate's Number

20 All lengths on a map are $\frac{1}{500}$ of their actual lengths.

Calculate

(a) the actual length of line represented on the map by a line 7,3 cm,

(b) the area on the map which represents an actual area of 525 m^2, giving your answer in cm^2.

Answer: *(a)* _____ [1]

(b) _____ cm^2 [3]

Centre Number	Candidate's Number

21 Evaluate

(a) $\dfrac{\log_5 64}{\log_5 4}$,

(b) $1 + \log_3 9$.

Answer: *(a)* _____ [2]

(b) _____ [2]

Centre Number	Candidate's Number

22 In the answer space below, is a line segment AB which is 7 cm long.

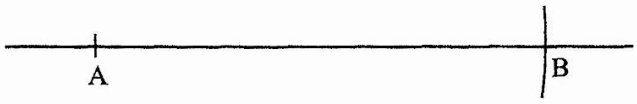
(a) Using ruler and compasses only, construct the locus of points

(i) 3 cm from B,

(ii) above AB, which are 2 cm from line AB.

(b) **(i)** Mark and label P_1 and P_2, points which are 3 cm from B and 2 cm from line AB.

(ii) Measure the distance P_1P_2.



Answer: *(a)* *(i)* on diagram [1]

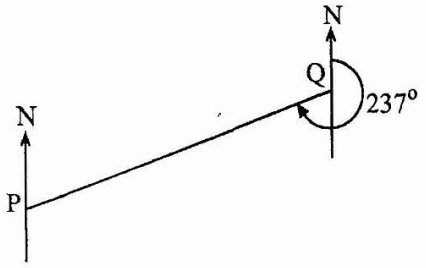
(ii) on diagram [2]

(b) *(i)* on diagram [1]

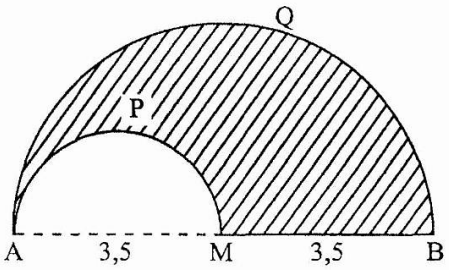
(ii) _____ cm [1]

Centre Number	Candidate's Number

23 (a)



In the diagram, P and Q are points on level ground. The bearing of P from Q is 237°. Find the bearing of Q from P.



(b) The diagram shows two semi circles APM and AQB. AM = MB = 3,5 cm. Taking π to be $\frac{22}{7}$, calculate the perimeter of the shaded region.

Answer: *(a)* _____ [2]

(b) _____ cm [3]

Centre Number	Candidate's Number

24

age in years	11	12	13	14	15
no of pupils	3	10	8	6	3

The ages of pupils in a class of 30 are shown in the table.

(a) Two pupils are chosen at random from the class, find the probability that one is aged 11 years and the other is aged 14.

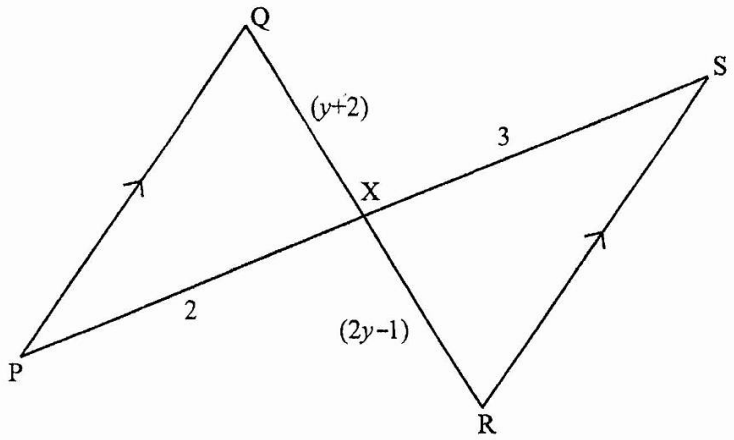
(b) Calculate the mean age of the pupils.

Answer: *(a)* _____ [2]

(b) _____ [3]

Centre Number	Candidate's Number

25



In the diagram, PQ is parallel to RS. PS and QR intersect at X. It is given that PX = 2 cm, SX = 3 cm, QX = $(y + 2)$ cm and RX = $(2y - 1)$ cm

(a) Name the triangle which is similar to triangle PQX.

(b) Using your results in **(a)**, find the value of y.

(c) Write down the length of QR.

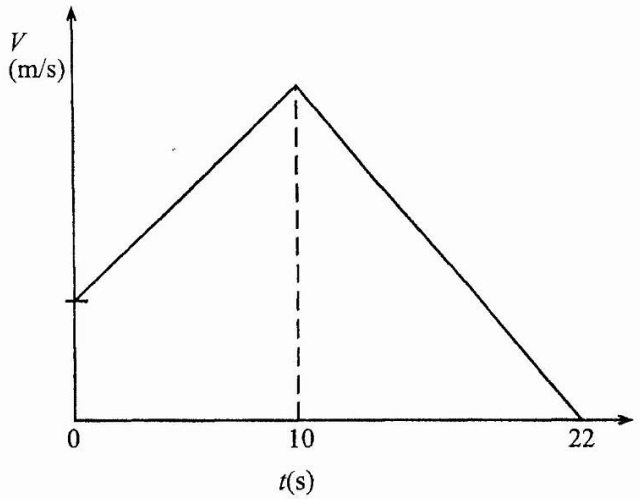
Answer: *(a)* _____ [1]

(b) $y =$ _____ [3]

(c) QR = _____ [1]

Centre Number	Candidate's Number

26



The diagram is the velocity-time graph of an object which accelerated uniformly for 10 seconds. During this time the velocity, V m/s, at time t seconds from the start, was given by $V = 6 + 2t$. It then decelerated uniformly to rest in a further 12 seconds.

Calculate

(a) the velocity of the object when $t = 0$,

(b) the deceleration of the object,

(c) the distance covered by the object in the 22 seconds,

(d) the average speed of the object for the whole journey.

26

Answer: *(a)* _____ m/s [1]

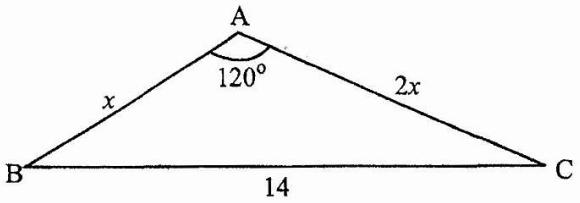
(b) _____ m/s^2 [2]

(c) _____ m [2]

(d) _____ m/s [1]

Centre Number	Candidate's Number

27



In the diagram, ABC is a triangle in which AB = x cm, AC = $2x$ cm, BC = 14 cm and $B\hat{A}C = 120°$.

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

(a) the value of x, leaving your answer in surd form,

(b) the area of triangle ABC.

[sin60° = 0,87; cos60° = 0,5; tan60° = 1,73]

Answer: *(a)* _____ [4]

(b) _____ cm^2 [2]