Candidate Name | Centre Number | Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

General Certificate of Education Ordinary Level

MATHEMATICS 4008/1, 4028/1

PAPER 1

JUNE 2011 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 23 printed pages and 1 blank page.

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

1 Simplify $\dfrac{\frac{2}{3}+\frac{3}{4}}{1\frac{1}{6}}$.

Answer: _____ [3]

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2 (a) Express the ratio 20 minutes : $1\frac{1}{3}$ hours, in its simplest form.

(b) Two partners, A and B, shared their profits from a business in the ratio 5 : 3.

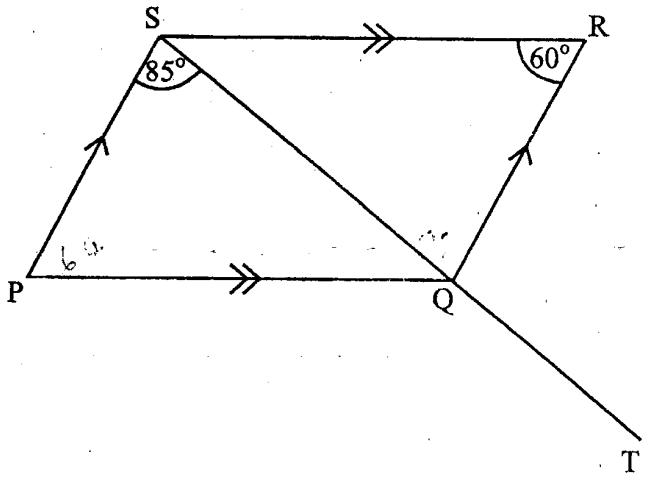
If B received \$4 800 000, calculate A's share.

Answer: (a) _____ [1]

(b) \$_____ [2]

Exa 3

For Examiner's Use



In the diagram, PQRS is a parallelogram. $P\hat{S}Q = 85°$, $S\hat{R}Q = 60°$ and SQT is a straight line. Find

(a) $P\hat{Q}R$,

(b) $R\hat{S}Q$,

(c) $R\hat{Q}T$.

Answer: *(a)* $P\hat{Q}R =$ _____ [1]

(b) $R\hat{S}Q =$ _____ [1]

(c) $R\hat{Q}T =$ _____ [1]

4 The bearing of village P from village Q is 109°. Find

(a) the three figure bearing of Q from P,

(b) the compass bearing of Q from P.

Answer: *(a)* _____ [2]

(b) _____ [1]

---

5 **(a)** Solve $x - 3 \leq 3x + 10$.

(b) Given that x is an integer, write down the least value of x for which $x - 3 \leq 3x + 10$.

Answer: *(a)* _____ [2]

(b) $x =$ _____ [1]

For Examiner's Use

6 Make u the subject of the formula $T = \frac{mu^2}{K} - 5mg$.

Answer: $u =$ _____ [3]

---

7 Express $5^2 + 3 \times 5 + 4$ as a number in

(a) base 5,

(b) base 8.

Answer: *(a)* _____ [1]

(b) _____ [2]

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8 (a) State the order of rotational symmetry of a parallelogram.

(b) The triangle XYZ has XY = 5 cm and YZ = 6 cm.

Given that the triangle XYZ has only one line of symmetry, write down the two possible lengths of XZ.

Answer: (a) _____ [1]

(b) _____ cm or _____ cm [2]

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9 A rectangle measures 10,2 cm by 7,1 cm, correct to one decimal place.

Find the minimum possible perimeter of the rectangle.

Answer: _____ cm [3]

For Examiner's Use

10 (a) A car uses l litres of petrol for every d kilometres travelled.

Ex

State the type of variation between l and d.

(b) Given that the car uses 5 litres to cover 60 kilometres, find the equation connecting l and d.

Answer: (a) _____ [1]

(b) _____ [2]

11 Evaluate

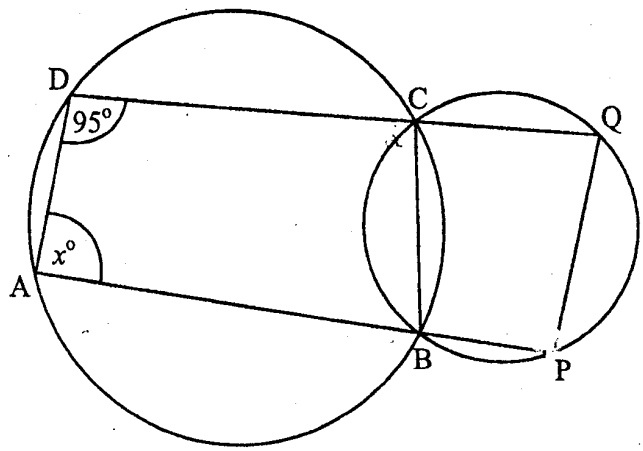
(a) $3m^{-5} \times 2m^{5}$,

(b) $\left(\frac{4}{9}\right)^{-\frac{1}{2}}$.

Answer: (a) _____ [1]

(b) _____ [2]

12



In the diagram, ABCD and PBCQ are intersecting circles. DCQ and ABP are straight lines.

(a) Given that $A\hat{D}C = 95°$, calculate

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

(ii) $P\hat{Q}C$.

(b) Given also that $D\hat{A}B = x°$, find an expression for $B\hat{P}Q$ in terms of x.

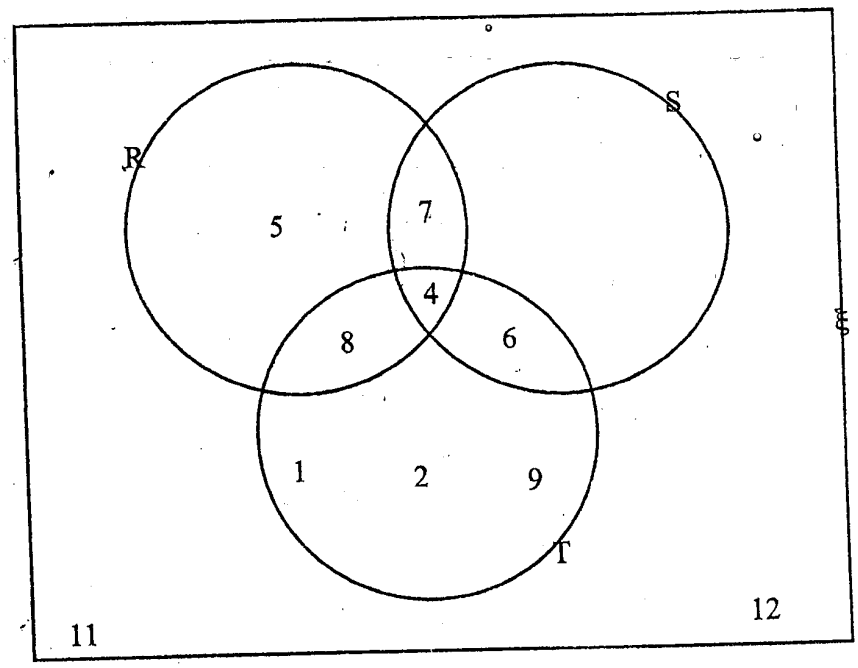
Answer: *(a)* *(i)* $A\hat{B}C =$ _____ [1]

(ii) $P\hat{Q}C =$ _____ [1]

(b) $B\hat{P}Q =$ _____ [1]

For Examiner's Use

Ex 13



In the Venn diagram, R, S, T and ξ are sets with their elements as shown.

Use the Venn diagram to find

(a) $R' \cap S$,

(b) $(R \cap S) \cup (R \cap T)$,

(c) $n(R \cup S \cup T)'$.

Answer: *(a)* _____ [1]

(b) _____ [1]

(c) _____ [1]

14 Express $\log_{10} x + 2\log_{10} y = 1$ as an equation in index form.

Answer: _____ [3]

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15 It is given that $\mathbf{p} = \begin{pmatrix} 6 \\ -8 \end{pmatrix}$, $\mathbf{q} = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$ and $\mathbf{r} = \begin{pmatrix} m \\ n \end{pmatrix}$.

(a) Express $\mathbf{p} - 3\mathbf{q}$ as a column vector.

(b) Given that $\mathbf{p} + \mathbf{q} = 3\mathbf{r}$, find the value of m and the value of n.

Answer: *(a)* _____ [1]

(b) $m =$ _____

$n =$ _____ [2]

For Examiner's Use

16 (a) Convert

(i) the fraction $\frac{3}{8}$ to a percentage,

(ii) 9% to a decimal fraction.

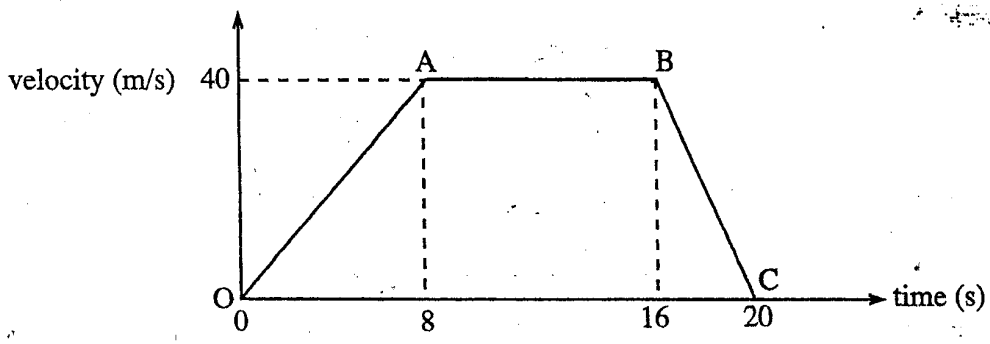
(b) Simplify the expression $\sqrt{3}+\sqrt{12}$.

Answer: (a) (i) _____% [1]

(ii) _____ [1]

(b) _____ [2]

17



In the diagram, O, A, B and C are four points on the velocity-time graph of an object.

(a) Describe the motion of the object as illustrated on the section of the graph.

(i) O to A,

(ii) A to B.

(b) Calculate the distance covered by the object during the 20 seconds.

Answer:

(a) *(i)* _____

_____ [1]

(ii) _____

_____ [1]

(b) _____ metres [2]

For Examiner's Use

18 The following entries show the number of bicycles sold per day in nine days.

6; 10; 12; 9; 14; 10; 15; 10; 12

Find

(a) the mode,

(b) the median,

(c) the next entry if the new mean on the tenth day is 12.

Answer: *(a)* _____ [1]

(b) _____ [1]

(c) _____ [2]

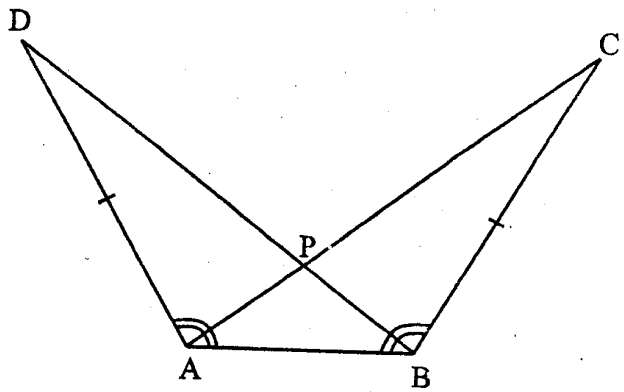
19 **(a)** Expand and simplify $(3x+2y)(2x-y)$.

(b) Factorise completely $20x^2 - 5y^2$.

Answer: *(a)* _____ [2]

(b) _____ [2]

20 (a)



For Examiner's Use

In the diagram, $D\hat{A}B = A\hat{B}C$, AD = BC and AC and BD intersect at P.

(i) Name the triangle that is congruent to triangle ABC.

(ii) State the case for congruency in (a)(i).

(b) The sides of a triangle X are 9 cm, 7 cm and 6 cm. The shortest side of a triangle Y, which is similar to triangle X, is 3 cm.

Write down the ratio, area of X : area of Y.

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

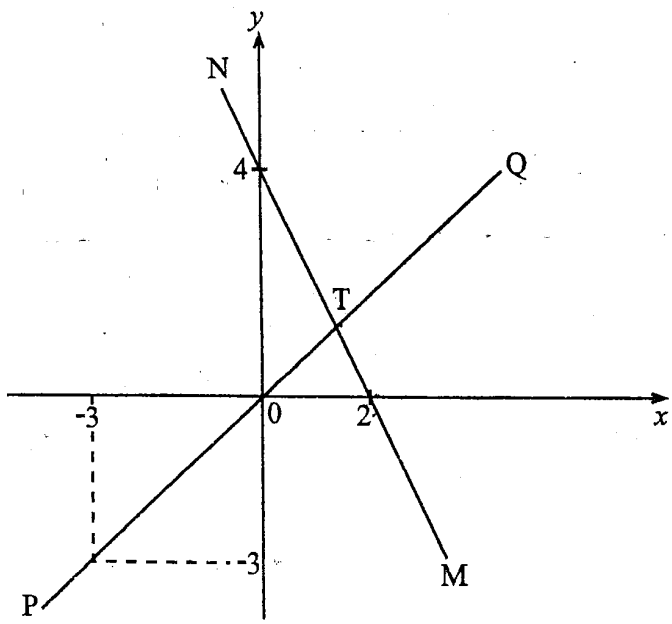
(ii) _____

_____

_____ [1]

(b) _____ [2]

21



In the diagram, PQ and MN are two straight lines which intersect at T.

(a) Find the equation of the line

(i) PQ,

(ii) MN.

(b) Calculate the coordinates of the point T.

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

(ii) _____ [2]

(b) (;) [2]

For Examiner's Use

22 The following is an extract from Mrs Green's telephone Bill for the period 01/03/06 to 31/03/06.

	$
Rental	2 000
177 units at X cents/unit	7 965
Sub-Total	9 965
VAT at 15%	*Y*
Amount due	*Z*

Calculate

(a) *X*,

(b) *Y*,

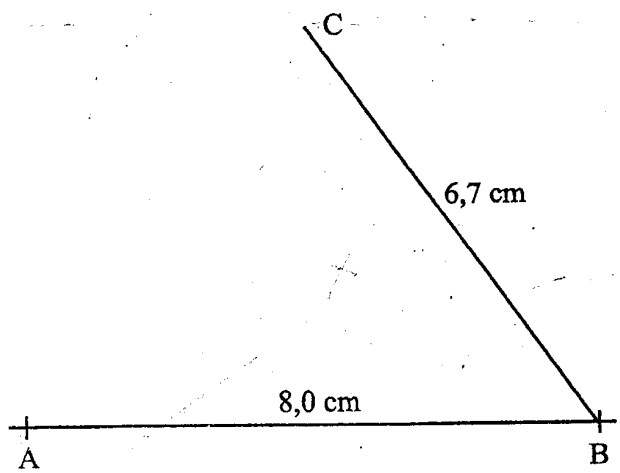
(c) *Z*.

Answer: *(a)* $X =$ _____ [2]

(b) $Y =$ _____ [2]

(c) $Z =$ _____ [1]

23



In the diagram, AB and CB are intersecting straight lines.

Use ruler and compasses only to construct on the diagram

(a) **(i)** the perpendicular bisector of BC,

(ii) a line on the same side of AB as C and is also 2,0 cm from AB.

(b) Mark the point X which is 2,0 cm from AB and equidistant from B and C.

Answer: *(a)* *(i)* on the diagram [2]

(ii) on the diagram [2]

(b) on the diagram [1]

For Examiner Use

24 **(a)** Solve the equation $\frac{2}{x+2} = \frac{1}{3}$.

For Examiner's Use

(b) Given that $f(x) = x^2 + x$, find

(i) $f(3)$,

(ii) the values of x for which $f(x) = 0$.

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

(b) *(i)* _____ [2]

(ii) _____ or _____ [2]

25 When a biased coin is tossed, the probability of getting a head is 0,6. For this coin, find

(a) the probability of getting a tail if it is tossed once,

(b) the probability of getting at least one head if it is tossed twice,

(c) the expected number of heads if it is tossed 50 times.

Answer: *(a)* _____ [1]

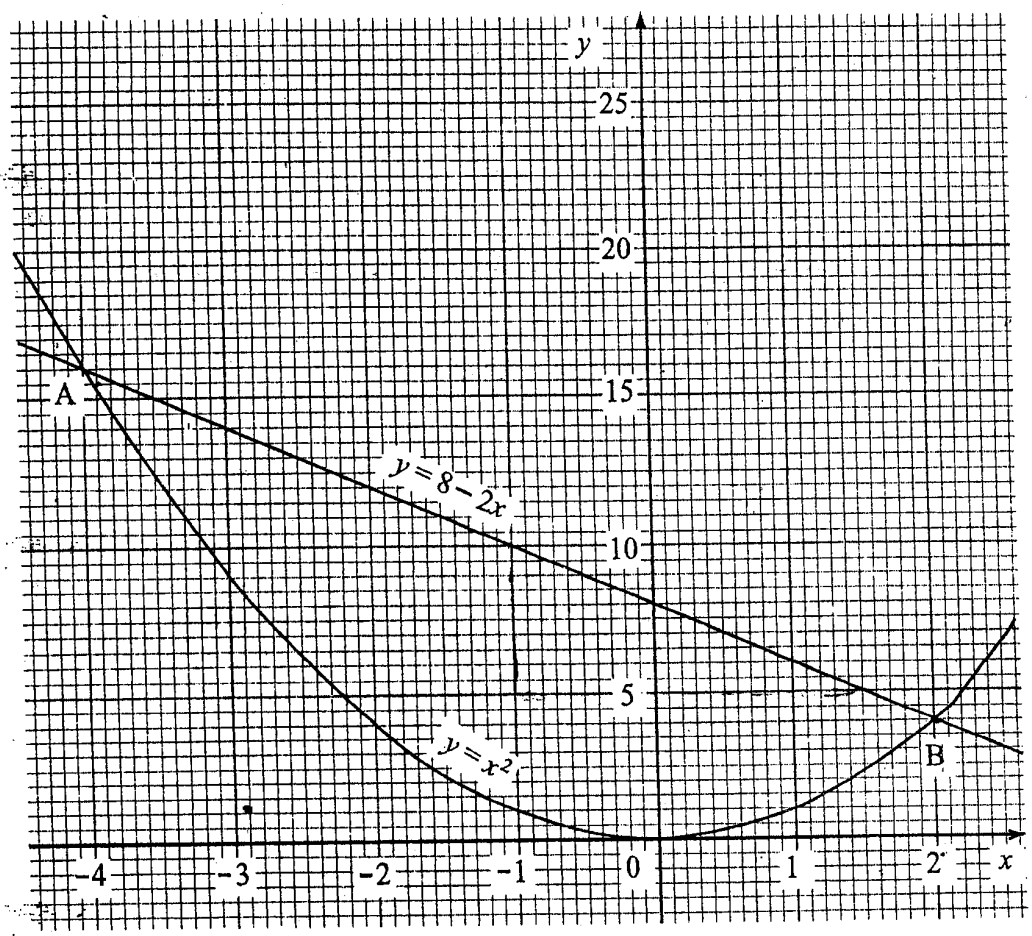
(b) _____ [2]

(c) _____ [2]

For Examiner's Use

26

Exa



In the diagram, the curve $y = x^2$ and the line $y = 8 - 2x$ intersect at A and at B.

(a) Write down

(i) the gradient of the line $y = 8 - 2x$,

(ii) the equation of the line passing through the origin and parallel to the line $y = 8 - 2x$.

(b) Write down the x- coordinate of

(i) A,

(ii) B.

(c) Write down an equation in x whose roots are your answers in **(b)**.

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

(ii) _____ [1]

(b) *(i)* at A $x =$ _____ [1]

(ii) at B $x =$ _____ [1]

(c) _____ [1]

For Examiner's Use

27 **In this question take π to be 3,14.**

A spherical ball is 20 centimetres in diameter. Calculate

(a) the surface area of the ball,

(b) the volume of the ball, correct to the nearest whole number.

$$\left[\begin{array}{l}\text{Surface area} = 4\pi r^2 \\ \text{Volume} = \frac{4}{3}\pi r^3\end{array}\right]$$

Answer: *(a)* _____ cm^2 [2]

(b) _____ cm^3 [3]