For Performance Measurement

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

GENERAL CERTIFICATE OF EDUCATION
ORDINARY LEVEL

MATHEMATICS
4008

Past Question Papers and Expected Answers

JUNE 1999 - NOVEMBER 2001

FOREWORD

The need for effective examination study booklets has been a continuing concern in our Zimbabwean schools. Due to a significant number of candidates who fail to come up with five 'O' Levels at one sitting, many teachers are forced to look for appropriate examination guides in order to adequately prepare their candidates for examination. Needless to say the main cause of underachievement as indicated in examination reports points towards failure by candidates to understand and interpret the requirements of the questions. Teachers are handicapped in developing good examination techniques within their candidates as they do not have relevant and viable examination booklets. These examination guides present questions and suggested solutions. The aim of the guides is to acquaint 'O' Level candidates with the structure of the examination, questions and expected solutions. The suggested solutions are meant to develop, within the candidates, effective examination techniques and strategies relevant to the examination. They are in no way meant to be viewed as the only prescription for answering the examination questions but more as an authentic approach to success in examinations by candidates preparing for the Zimbabwean General Certificate of Education (ZGCE) Ordinary Level.

This booklet is part of the second series that cover a number of subjects on offer at our examination centres. The first series was up to the 1998 examinations. We hope that the series will contribute in developing, within our candidates, effective examination techniques in the area of subject mastery, question interpretation and presentation of answers. This service by the Council will benefit all our stakeholders whose main interest is to improve the performance of our candidates in examinations.

E.S. Nhundara
ACTING DIRECTOR - ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

Candidate Name _____

Centre Number	Candidate Number

ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
in collaboration with
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
General Certificate of Education Ordinary Level

MATHEMATICS 4008/1, 4028/1

PAPER 1

Friday 4 JUNE 1999 Morning 2 hours 30 minutes

Candidates answer on the question paper.
No additional materials are required.

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.
Mathematical tables, slide rules and calculators may 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

For Examiner's Use

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

1 **(a)** Find the exact value of

(i) $5,4 \times 0,06$,

(ii) $16,5 - 4,96$.

(b) Express 840 m as a fraction of 2,1 km, giving your answer in its simplest form.

Answer (a) (i) _____

(ii) _____ [

(b) = _____

---

2 **(a)** **(i)** Express 0,008 478 correct to two decimal places.

(ii) Express 0,008 478 in standard form.

(b) Write down, correct to the nearest integer, $\sqrt{402}$.

Answer (a) (i) _____ [1]

(ii) _____ [1]

(b) _____ [1]

3 Given that $l = -4$, $m = -3$ and $n = 5$, find the value of

(a) lmn,

(b) $3l - m$,

(c) $2n^2$.

Answer (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

---

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

(a) base five,

(b) base two.

Answer (a) _____ [1]

(b) _____ [2]

---

3 Given that $l = -4$, $m = -3$ and $n = 5$, find the value of

(a) lmn,

(b) $3l - m$,

(c) $2n^2$.

Answer (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

---

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

(a) base five,

(b) base two.

Answer (a) _____ [1]

(b) _____ [2]

---

8 (a) At the beginning of an examination the clock in the examination room was se
2 p.m. The examination ended at 5 p.m.

Find the angle, in degrees, through which

(i) the hour hand turns during the examination;

(ii) the minute hand turns during the examination.

(b) Calculate the obtuse angle between the hour hand and the minute hand of at 12.30 p.m.

Answer (a) (i) .....

(ii) .....

(b) .....

---

9 The table shows the results of the games played by the Gweru Giraffes last season points awarded in the League Table.

	Won	Drawn	Lost
Number of games	20	4	6
Points awarded per game	x	2	0

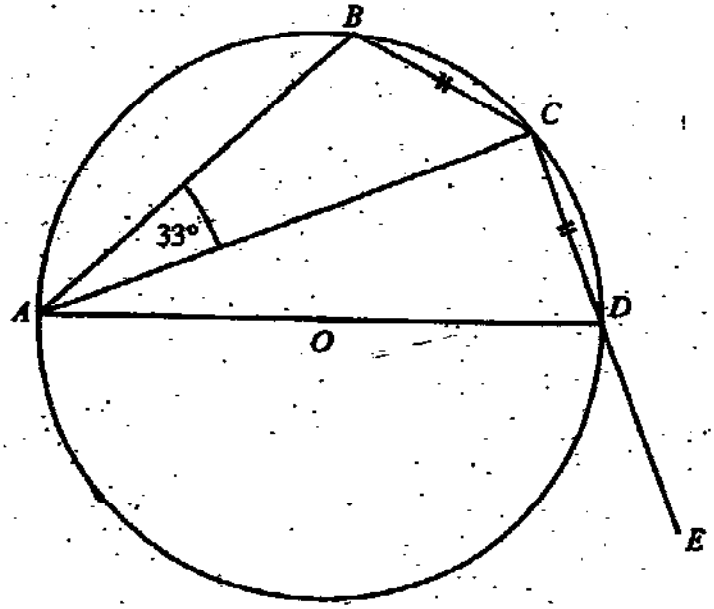
(a) Given that they gained a total of 108 points, calculate the value of x.

(b) The Chinhoyi Cheetahs played the same number of games as the Gweru G
They drew 6 games and won twice as many games as they lost. Calculate the nu
points they gained.

Answer (a) .....

(b) .....

7



In the diagram, AD is the diameter of the circle $ABCD$. Chords BC and CD are equal and $C\hat{A}B = 33°$. The side CD is produced to E.

Calculate

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

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

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

Answer (a) $B\hat{A}D =$ ..... ° [1]

(b) $B\hat{C}D =$ ..... ° [1]

(c) $A\hat{D}E =$ ..... ° [1]

10 The following notice was displayed at an airport:

Temperatures (°C) at Air Zimbabwe International Destinations. Date: 3/1/99.

Destination	Minimum	Maximum
Frankfurt	−11	−3
Larnaca	9	20
London	−5	0
Rome	10	13

(a) At which destination

(i) was the lowest temperature recorded,

(ii) was the greatest range of temperatures recorded?

(b) On 4th January the minimum temperature recorded in Frankfurt was 3 °C lower than on 3rd January.

Calculate the minimum temperature in Frankfurt on 4th January.

Answer (a)(i) _____ [1]

(ii) _____ [1]

(b) _____ °C [1]

---

11 All the lengths on a scale drawing are one eighth of their actual lengths.

Calculate

(a) the actual length of a line represented by a line 5.6 cm long on the scale drawing,

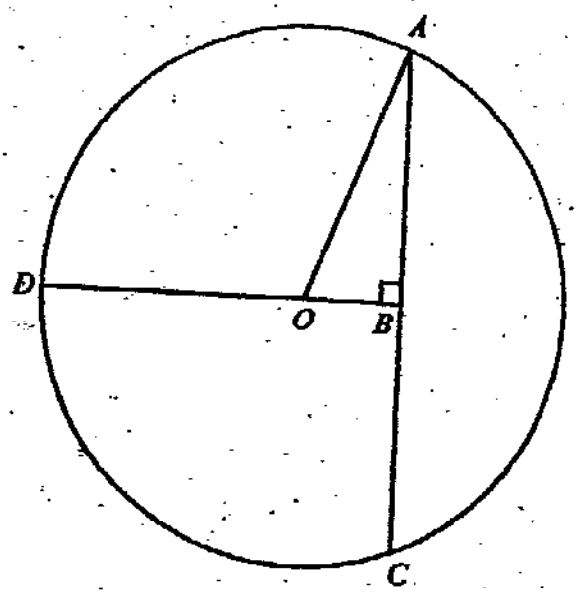
(b) the area on the scale drawing which represents an actual area of 896 cm^2.

Answer (a) _____ cm [1]

(b) _____ cm^2 [2]

For Examiner's Use

12



The circle ACD has centre O and radius 13 cm.
The chord ABC is perpendicular to the straight line DOB and has a total $AC = 24$ cm.

(a) Calculate the length of OB.

(b) Write down, as a fraction, the value of $\cos A\hat{O}D$.

Answer (*a*) _____ cm

(*b*) $\cos A\hat{O}D =$ _____

13 Write down a simple geometrical reason why it is not possible to draw

(a) (i) a quadrilateral $ABCD$ with angles 70°, 107°, 50° and 100°,

(ii) a triangle LMN with sides 11,4 cm, 5,2 cm and 4,7 cm.

(b) What are complementary angles?

Answer (*a*) (i) _____

(ii) _____

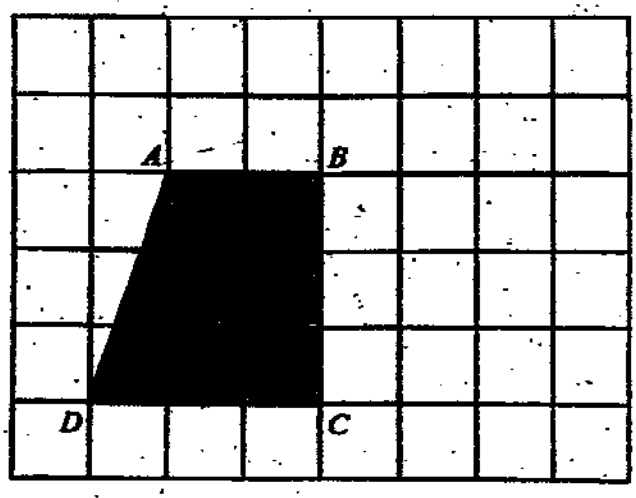
(*b*) _____

1 (a) Write down the order of rotational symmetry of an equilateral triangle.

Answer (*a*) ..... [1]

(b) On the diagram in the answer space, shade the image of *ABCD* so that the resulting, complete, shape has *BC* as a line of symmetry.

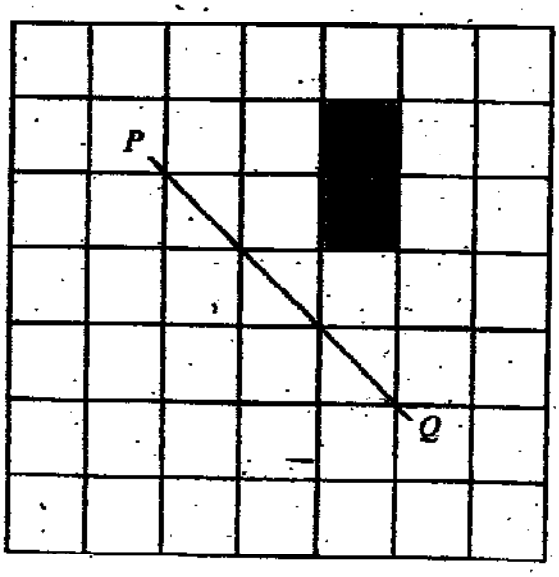
Answer (*b*)



[1]

(c) On the diagram in the answer space, shade the image which is the reflection of the shaded shape in the line *PQ*.

Answer (*c*)



[1]

... square metres,

(b) 2 cubic metres in litres,

(c) 3,85 hours in hours and minutes.

Answer (a) _____ square metr

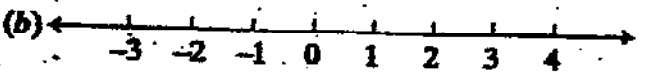
(b) _____ litr

(c) _____ hours _____ minut

16 (a) Solve the inequality $-7 < 2 - 3x \leqslant 5$.

(b) Illustrate your answer to part (a) on the number line in the answer space.

Answer (*a*) _____ [2]

(*b*) 

[1]

---

7 A man estimates that each side of a square floor has a length of 4 metres, correct to the nearest metre.

Find the difference between the largest and smallest possible calculated values of the area of the floor.

Answer _____ m^2 [3]

---

18 Solve the equations

(a) $\frac{3h}{5} + 4 = 13$,

(b) $y(y+3) - 2(y+3) = 0$.

Answer (a) $h =$ _____

(b) $y =$ _____ or _____

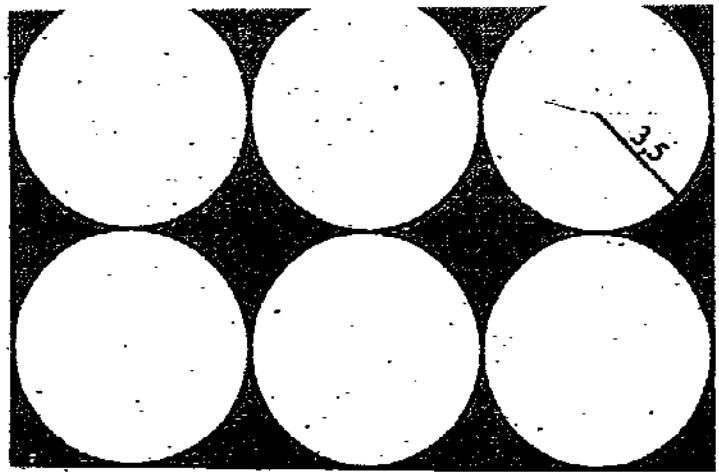
19 Evaluate

(a) $3^4 \div 5^2$, giving your answer as an exact decimal,

(b) $\log_3 45 - \log_3 5$.

Answer (a) _____

(b) _____



Take π to be $\frac{22}{7}$.

The diagram shows a pattern used in dressmaking. It consists of six equal circles of radius 3,5 cm inscribed in a rectangle. The sides of the rectangle are tangents to the circles which touch other circles as shown.

Calculate

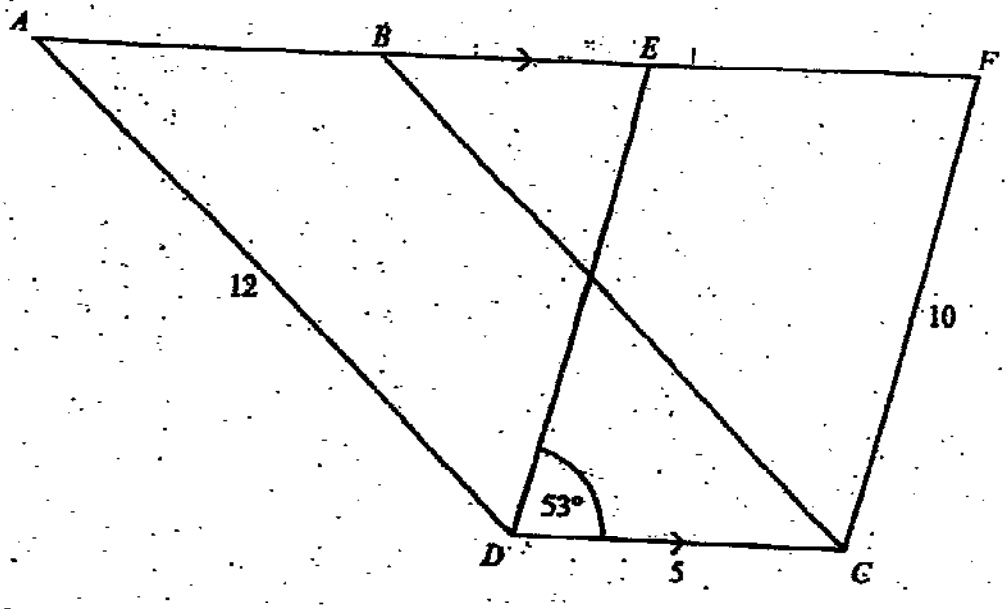
(a) the area of the rectangle,

(b) the area of the shaded region.

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

(*b*) _____ cm^2 [2]

21



In the diagram, $ABCD$ and $EFCD$ are parallelograms on the same base DC and bet the parallel lines DC and $ABEF$.

$DC = 5$ cm, $AD = 12$ cm, $FC = 10$ cm and $E\hat{D}C = 53°$.

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

(a) the area of the parallelogram $EFCD$,

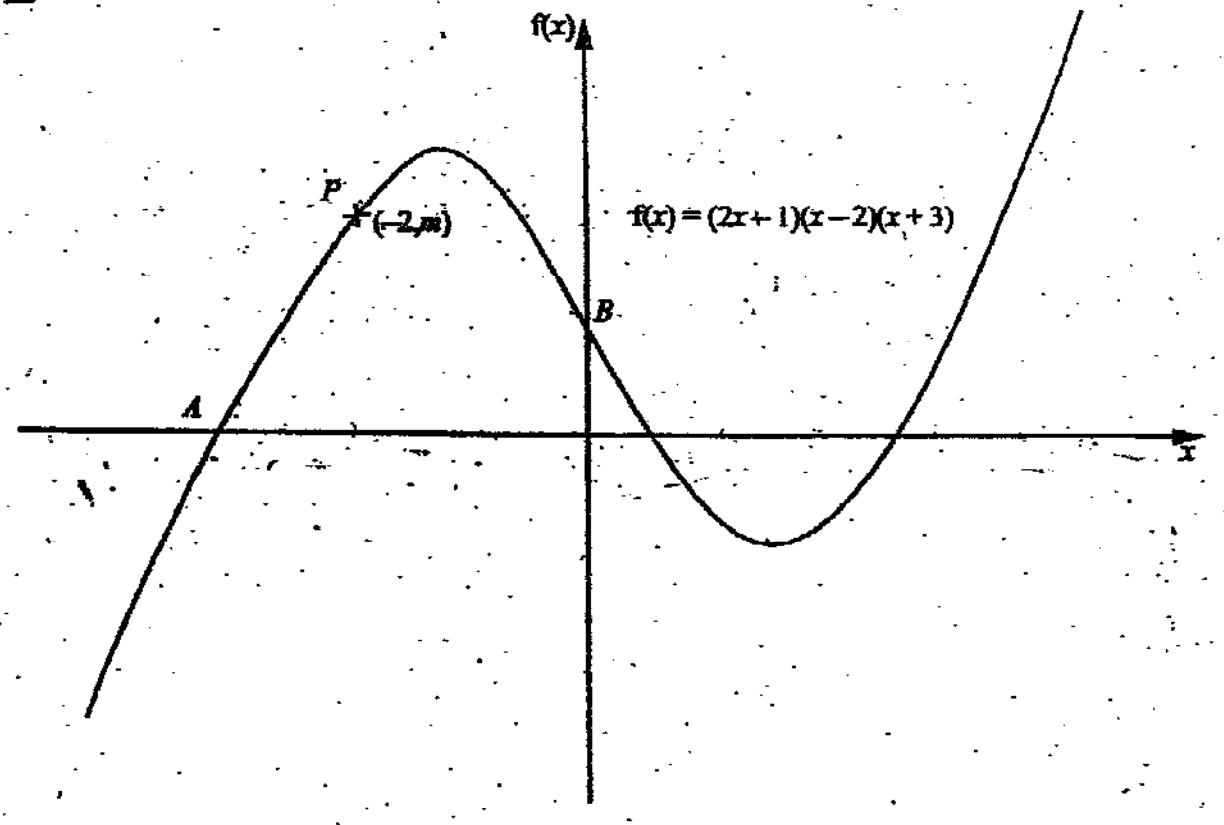
(b) $\sin B\hat{C}D$, in its lowest terms.

[$\sin 53° = 0{,}80$; $\cos 53° = 0{,}60$; $\tan 53° = 1{,}33$.]

Answer (a) ..... cm^2

(b) $\sin B\hat{C}D =$ .....

22



The diagram shows the graph of $f(x) = (2x - 1)(x - 2)(x + 3)$.

(a) Find the coordinates of

(i) A,

(ii) B.

(b) The point $P(-2, m)$ lies on the curve. Calculate the value of m.

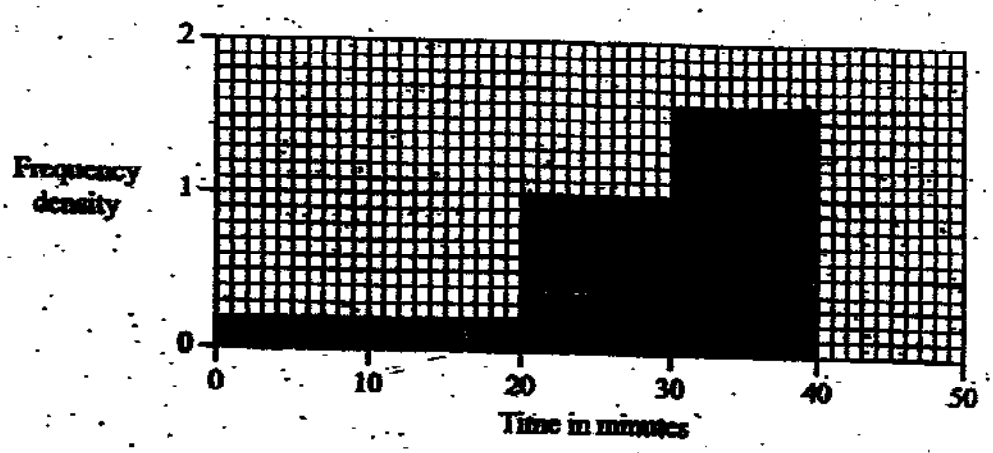
Answer (a) (i) A is (_____, _____) [1]

(ii) B is (_____, _____) [1]

(b) $m =$ _____ [2]

[Turn over

23 A survey is carried out to find the number of minutes each member of a class takes to f a multiple choice test. The diagram below is an incomplete histogram used to illustrat results of the survey.



Another way to represent the same information is shown below.

Time (t)	$0 < t \leq 20$	$20 < t \leq 30$	$30 < t \leq 40$	$40 < t \leq$
Frequency	x	10	16	9

(a) Find the value of x.

(b) Complete the given histogram.

(c) Write down the modal time interval.

Answer (a) $x =$ _____

(b) (on the diagram)

(c) _____

inverse of its length, L.

(a) Write down a formula for S in terms of D, L and a constant, k.

(b) Given that $S = 18$ when $D = 3$ and $L = 5$, find the value of k.

(c) Calculate the value of D when $S = 20$ and $L = 6$, leaving your answer in surd form.

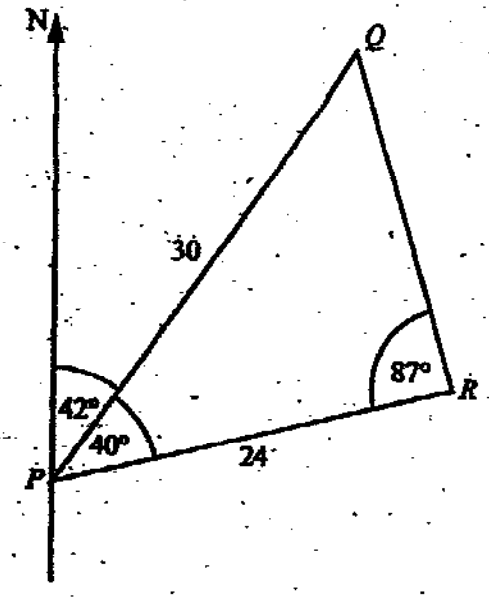
Answer (*a*) $S =$ ..... [2]

(*b*) $k =$ ..... [2]

(*c*) $D =$ ..... [2]

Use

25



In the diagram, P, Q and R represent points on level ground with $PQ = 30$ m, $PR = 24$ m, $P\hat{R}Q = 87°$ and $Q\hat{P}R = 40°$. The bearing of Q from P is 042°.

Use as much of the information given below as is necessary.

(a) Calculate

(i) the bearing of R from Q,

(ii) how far Q is north of P.

(b) R is the base of a vertical mast RT.
The angle of elevation of the top of the mast, T, from P is also 42°.
Calculate the height of the mast RT.

[sin 42° = 0,67; cos 42° = 0,74; tan 42° = 0,90.]

Answer (*a*) (i) .....

(ii) ..... m

(*b*) ..... m

26 In 1999 a television set had a marked price of $7370,00.

(a) Mr Mogo paid cash and was allowed 15% discount. Calculate the discount.

(b) Mr Dube bought the television set through a lay-by scheme. In this scheme he paid an initial deposit of $\frac{2}{5}$ of the marked price and then 3 equal monthly instalments, before he collected the television set. Calculate each monthly instalment.

(c) The marked price in 1999 was a result of a 10% increase over the marked price of the previous year. Calculate the marked price of the television set in 1998.

Answer (a) $ ..... [2]

(b) $ ..... [2]

(c) $ ..... [2]

27 (a)

1	2	3	4		10		n	
1	3	5	7		x		y	

Table 1

Consider the pattern of the numbers shown in Table 1 above, which is incomple

(i) Write down the value of x.

(ii) Express y in terms of n.

(b) Table 2 shows the first lines of another pattern.

Line	Terms	Sum of terms
1	1	1
2	1, 3	4
3	1, 3, 5	9
4	1, 3, 5, 7	.....
.....	.....	.....
7	.....	.....
.....	.....	.....

Table 2

(i) Complete line 4 in Table 2 above.

(ii) Complete line 7 in Table 2 above.

(iii) Write down the sum of the terms in line 30 of the table.

Answer (a) (i) $x =$ ..... [1]

(ii) $y =$ ..... [2]

(b) (i) (in the table) [1]

(ii) (in the table) [2]

(iii) ..... [1]