

Name : _____

Class 11MTG ____

CHERRYBROOK TECHNOLOGY HIGH SCHOOL

2002

AP2

YEAR 11

YEARLY EXAMINATION

**GENERAL
MATHEMATICS**

*Time allowed - One and a half hours
(Plus 5 minutes' reading time)*

DIRECTIONS TO CANDIDATES:

- * Approved calculators may be used.
- * Diagrams are not drawn to scale.
- * A Formula sheet is provided.

SECTION I

- * Attempt ALL questions in SECTION I (Question 1-21 multiple choice) 21 MARKS
- * Complete your answers on the answer grid provided.

SECTION II

- * Attempt ALL questions in SECTION II (Question 22 - 24) 39 MARKS
- * Use the writing paper provided.
- * Begin each question on a new page and show your name and class.
- * All necessary working should be shown in every question.
- * Full marks may not be awarded for careless or badly arranged work.
- * Page 8 is to be used when completing Question 24 (a). Please detach page 8 and staple it to your solution for Q24.

Section I

Marks: 21

- Colour in the correct response on the multiple choice answer sheet

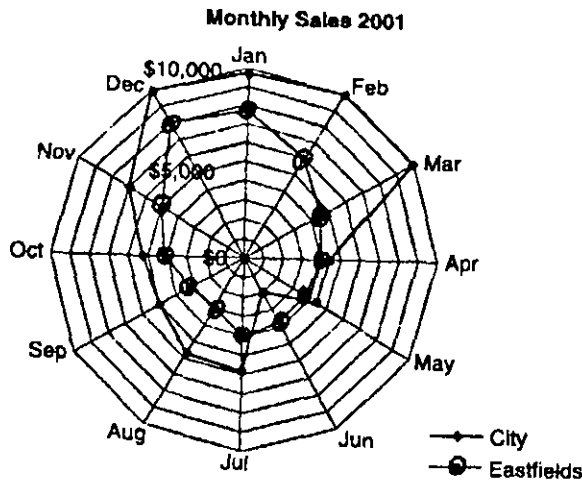
1. Use the formula $D = \frac{ya}{y+12}$ to find the value of D if $a = 5$ and $y = 8$
- (A) $D = 2$ (B) $D = 4.5$ (C) $D = 17$ (D) $D = 22.625$
2. The marks out of 10 for an arithmetic test were 7, 8, 6, 8, 6, 5, 6, 4, 7, 10. The mean of the data is
- (A) 5.6 (B) 6 (C) 6.5 (D) 6.7
3. Christosa works in a computer shop. He is paid \$170 per week plus 12% of the amount of his sales. Calculate his pay in a week when he sells \$2 600 worth of goods.
- (A) \$184.50 (B) \$190.40 (C) \$312 (D) \$482
4. Calculate the charge and supply fee, GST inclusive, for a quarter when 6000 MJ of natural gas is used

Natural Gas	GST excl	GST incl
Charge per MJ (1 st 4,500 MJ/qtr)	1.16670c	1.28337c
Charge per MJ (thereafter)	1.02360c	1.12596c
Supply fee per quarter	\$29.640	\$32.604

- (A) \$99.64 (B) \$97.50 (C) \$109.61 (D) \$107.25
5. The marked price of a DVD player is \$450. Danny buys the DVD player at a sale for \$396. Calculate the percentage discount.
- (A) 12% (B) 14% (C) 54% (D) 88%
6. The earth is 150 million kilometres from the sun. Express this distance in scientific notation.
- (A) 1.5×10^9 (B) 1.5×10^8 (C) 1.5×10^7 (D) 1.5×10^6
7. Expand and simplify $2 + 4(3x - 1)$
- (A) $12x + 1$ (B) $12x - 2$ (C) $18x - 1$ (D) $18x - 6$
8. Joshua invests \$15 000 for 4 months at 5.1% per annum. Find the interest from this investment.
- (A) \$255 (B) \$306 (C) \$2550 (D) \$3060

Section I (Continued)

9. A car manufacturer keeps records as to the most popular colour of cars that are sold. Which of the following best describes the type of data collected?
- (A) Discrete (B) Stratified (C) Categorical (D) Continuous
10. The type of survey conducted by the car manufacturer in Question 9 could best be described as
- (A) a random sample (B) a stratified sample
(C) a systematic sample (D) census
11. The average price of 8 houses in a particular street is \$240 000. A ninth house is built and the average price has grown to \$245 000. The price of the ninth house is:
- (A) \$240 000 (B) \$245 000 (C) \$250 000 (D) \$285 000
- 12.



The radar graph shows the sales of two department stores; the Eastfields store and the City store. During which month do the Eastfields store sales exceed the City store sales?

- (A) January (B) March (C) June (D) July
13. The results of a test are displayed in a box and whisker plot

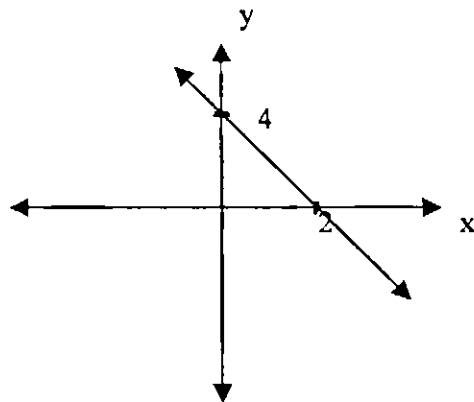


Which of the following statements is false?

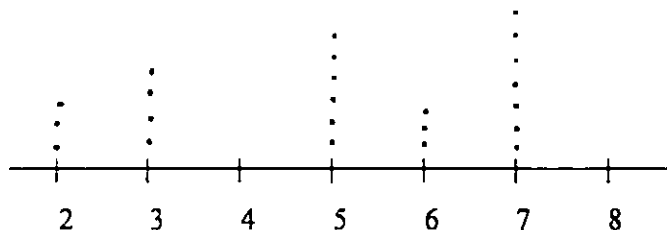
- (A) The median is 60
(B) The range is 55
(C) The interquartile range is 20
(D) 50% of the scores are above 60.

Section I (Continued)

14. Pamela and George divide their Footy Tab winnings in the ratio of 5:3 respectively. If Footy Tab paid \$2576, how much will Pamela receive?
- (A) \$322 (B) \$966 (C) \$1545.60 (D) \$1610
15. Justin buys a big screen television on interest-free terms from a department store. The price of the television is \$4584. Justin pays $\frac{1}{3}$ of the price and then monthly repayments of \$84.89. How long does it take for Justin to pay off the television?
- (A) 12 months (B) 24 months (C) 30 months (D) 36 months
16. State the equation of the line drawn below.



- (A) $y = 4 + 2x$ (B) $y = 2x - 4$ (C) $y = 4 - 2x$ (D) $y = 4 + \frac{1}{2}x$
17. Matthew invests \$25 000 into a 2-year fixed term deposit that pays 8% p.a. with interest compounded six monthly. The amount of interest earned by Matthew is:
- (A) \$4000.00 (B) \$4246.46 (C) \$29 000.00 (D) \$29 246.46
- 18.



The mean of the data in the above dot diagram is:

- (A) 3.7 (B) 5 (C) 4.6 (D) 7

Section I (Continued)

19. $\frac{3x^3y^2}{30x^2y^3}$ simplifies to

- (A) $\frac{x}{10y}$ (B) $\frac{10x}{y}$ (C) $\frac{y}{10x}$ (D) $\frac{10y}{x}$

20. The solution to the equation $4(2x - 2) - 3(5x - 7) = 0$ is

- (A) $x = \frac{13}{7}$ (B) $x = \frac{19}{7}$ (C) $x = -\frac{13}{7}$ (D) $x = -\frac{19}{7}$

21. If 8% of an amount is \$240, the whole amount is:

- (A) \$130 (B) \$300 (C) \$1300 (D) \$3000

Section II

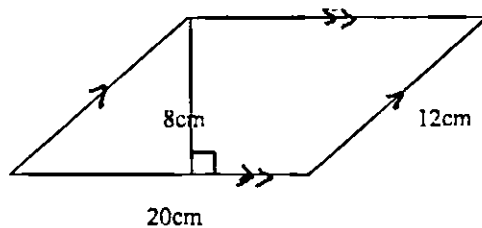
Attempt Questions 22-24

Marks

Question 22 (Start a new page) (13 marks)

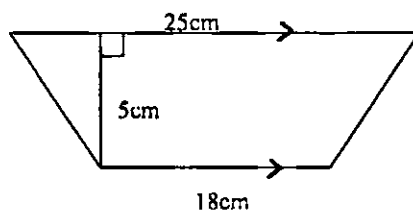
(a) Find the area of the following shapes (Not drawn to scale)

(i)



1

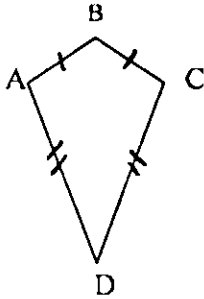
(ii)



1

Question 22 (Continued)

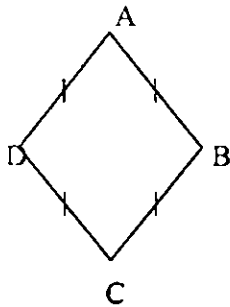
(iii)



$AC = 11\text{m}, BD = 22.5\text{m}$

1

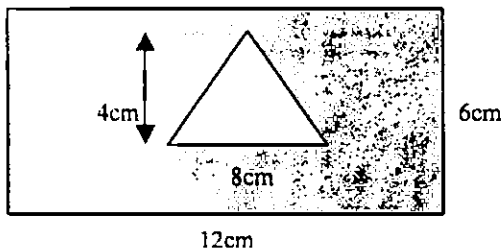
(iv)



$AC = 6\text{cm}, BD = 12\text{cm}$

1

(v) Find area of shaded part



2

(b) The following scores (out of 50) were achieved in a Spanish test in a class of 23 students. The results are set out below in a stem and leaf graph.

Stem	Leaf
1	7 7 9
2	1 4 6 6 6 7
3	0 1 3 3 5 8 8
4	1 4 7 7 7 7 8

- (i) Find the range 1
- (ii) Find the median 1
- (iii) Find the mean mark 1
- (iv) Find the standard deviation (to 2 d.p.) 1
- (v) Find the upper quartile 1

Question 22 (Continued)

(c) Copy and complete this table of values onto your page, for $y = 3x + 1$

(i)

\bar{x}	-1	0	1	2
y				

(ii) graph the equation $y = 3x + 1$.

1
1

Question 23 (Start a new page) (14 marks)

(a) A company has 16 employees with the following weekly wages:

\$396.20 \$425.30 \$464.50 \$515.10 \$535.00
 \$535.00 \$535.00 \$535.00 \$535.00 \$578.60
 \$578.60 \$578.60 \$831.80 \$1025.00

- (i) Find the mode of the data. 1
- (ii) Find the mean (to 2 dp) 1
- (iii) Find the median wage. 1
- (iv) Which of the three measures of central tendency is the best indication of the 'average' wage? Why? 2

(b) Ceiling paint covers at the rate of $16.5 \text{ m}^2/\text{L}$.

- (i) What area could be painted with three 4 litre cans? 1
- (ii) How many litres would be needed to paint an area of 300m^2 ? (Ans to nearest litre) 1
- (iii) How many 4 litre cans would you need to buy, to paint the area in part (ii) 1

- (c) (i) Convert 3 cents/min into \$/day 1
- (ii) Express in the form 1: n, 3cm:5m 1

(d) The length of a table was measured to be 154cm to the nearest centimetre.

- (i) What is the greatest possible error? 1
- (ii) Calculate the percentage error (to 2 dp) 1

(e) Penny received a discount of \$133.50 on a T.V. set. This was 15% of the original price. Find the original price of the T.V. 2

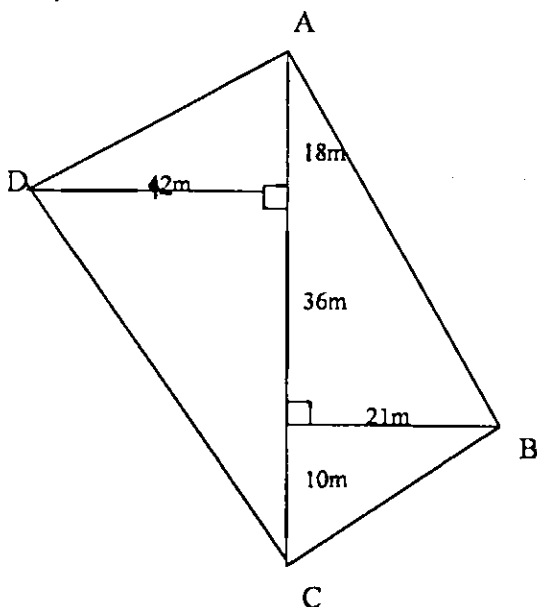
Question 24 (start a new page) (12 marks)

(a) At a doctor's surgery, the number of patients seen each weekday over a 4 week period is recorded.

33	29	19	18	16
30	29	20	24	21
36	34	17	19	31
45	36	22	23	35

- (i) Find the mean of the data set. 1
- (ii) Find the standard deviation of the data set. Explain your choice of population or sample standard deviation. 2
- (iii) Complete the frequency distribution table on page 8 1
- (iv) On the grid provided on page 8, draw a cumulative frequency histogram and cumulative frequency polygon (ogive) for the data. 2
- (v) Use your graph to estimate the median of the distribution. 1
- (vi) Use your graph to estimate the interquartile range of the distribution. 1

(b) An offset survey was conducted of a park with the notebook entry shown below. (not to scale)



- (i) Find the length of the side AB correct to one decimal place. 2
- (ii) Find the area of the park. 2

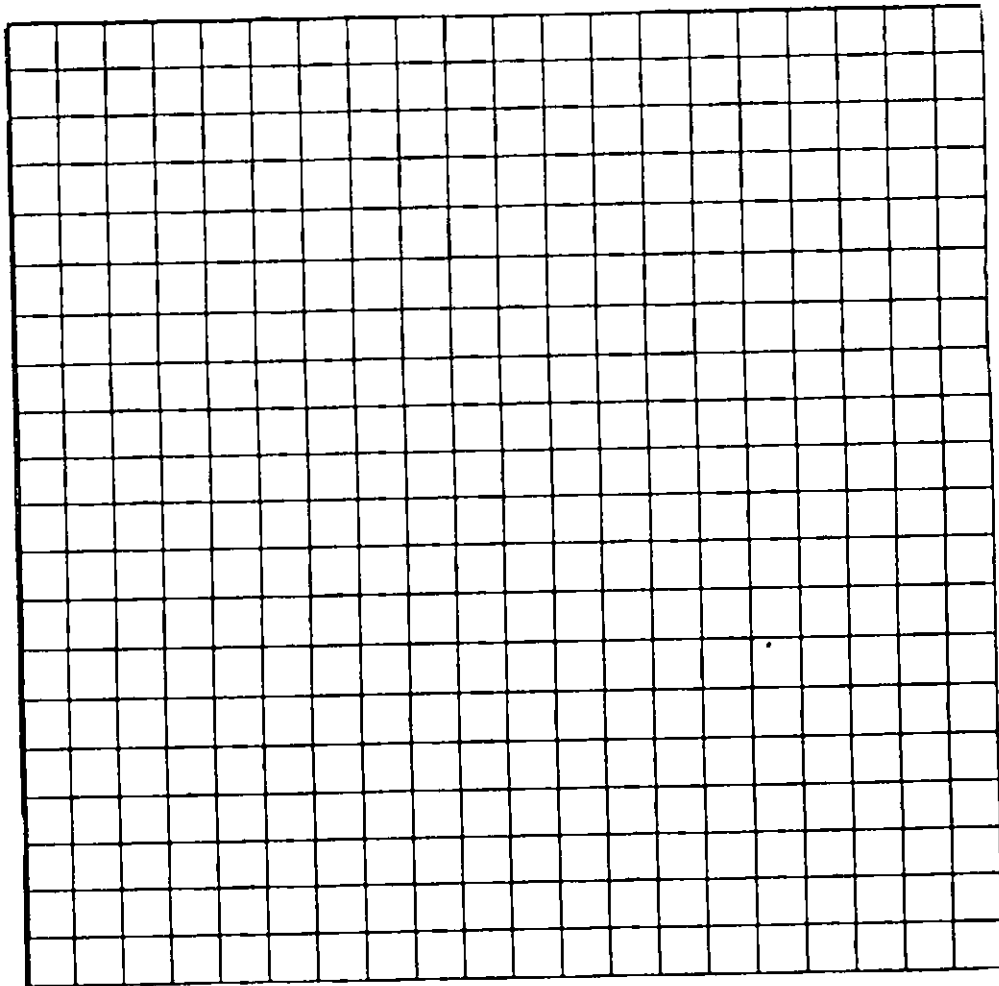
Name: _____ Class: 11MTG _____

Please remove this page and attach it to your answer for Question 24

Frequency distribution table for Question 24 (a) (iii)

Class	Class centre	Tally	Frequency	Cumulative Frequency
16 - 20				
21 - 25				
26 - 30				
31 - 35				
36 - 40				
41 - 45				

Use the grid below to answer Question 24 (a) (iv)



Answer sheet for Section 1

- | | | | |
|--|------------------------------------|------------------------------------|------------------------------------|
| 1. A <input checked="" type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 2. A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input checked="" type="radio"/> |
| 3. A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input checked="" type="radio"/> |
| 4. A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input checked="" type="radio"/> |
| 5. A <input checked="" type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 6. A <input type="radio"/> | B <input checked="" type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 7. A <input type="radio"/> | B <input checked="" type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 8. A <input checked="" type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 9. A <input type="radio"/> | B <input type="radio"/> | C <input checked="" type="radio"/> | D <input type="radio"/> |
| 10. A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input checked="" type="radio"/> |
| 11. A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input checked="" type="radio"/> |
| 12. A <input type="radio"/> | B <input type="radio"/> | C <input checked="" type="radio"/> | D <input type="radio"/> |
| 13. A <input type="radio"/> | B <input type="radio"/> | C <input checked="" type="radio"/> | D <input type="radio"/> |
| 14. A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input checked="" type="radio"/> |
| 15. A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input checked="" type="radio"/> |
| 16. A <input type="radio"/> | B <input type="radio"/> | C <input checked="" type="radio"/> | D <input type="radio"/> |
| 17. A <input type="radio"/> | B <input checked="" type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 18. A <input type="radio"/> | B <input checked="" type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 19. A <input checked="" type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 20. A <input checked="" type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input type="radio"/> |
| 21. A <input type="radio"/> | B <input type="radio"/> | C <input type="radio"/> | D <input checked="" type="radio"/> |

Q 22

a) i) $A = 8 \times 20$
 $= 160 \text{ cm}^2$ ①

ii) $A = \frac{1}{2} \times 5 \times (2.5 + 1.8)$
 $= 107.5 \text{ cm}^2$ ①

iii) $A = 11 \times 22.5 \times \frac{1}{2}$
 $= 123.75 \text{ m}^2$ ①

iv) $A = 6 \times 12 \times \frac{1}{2}$
 $= 36 \text{ cm}^2$ ①

v) $A = 12 \times 6 - \frac{1}{2} \times 4 \times 8$ ①
 $= 72 - 16$
 $= 56 \text{ cm}^2$ ①

(-1 for 1 mistake)

b) i) Range $48 - 17 = 31$ ①

ii) median = 33 ①

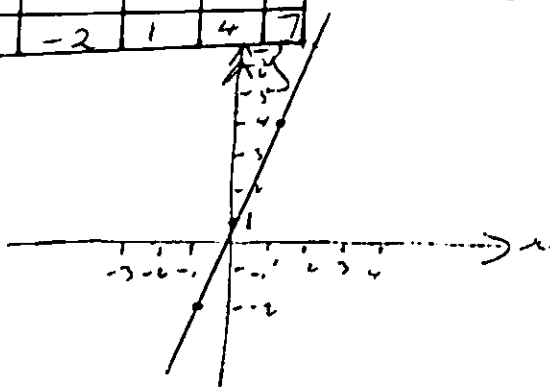
iii) mean = 23 ①

iv) SG = 10.17 ①

v) upper quartile = 44 ①

c)

x	-2	-1	0	1	2
y	-2	1	4	7	



$y = 3x + 1$ (-1/2 for 2nd mistake)

①

Q23

a) i) \$535.00 - mode ①

ii) mean \$576.34 ①

iii) median \$535.00 ①

iv) $\frac{\text{mean} - \text{mode}}{\text{mode}}$ ① would have more workers on lower level wage so mode and median would not be useful as they would be too low (something like this - use your discretion) ①

b) i) $16.5 \times 12 = 198 \text{ m}^2$ ①

ii) $300 \div 16.5 = 19 \text{ L}$ ①

iii) 5, 4 litre cans ①

c) i) $3 \text{ c/min} = \frac{3 \times 60 \times 24}{100}$
 $= \$43.20/\text{day}$ ①

ii) 1: n
3: 500
1: $\frac{500}{3}$ ①

d) i) 154 cm 0.5 cm greatest possible error ①

ii) $\frac{0.5}{154} \times 100 = 0.32\%$ ①

e) $15\% = 133.50$

$1\% = \frac{133.50}{15}$ ①

$1\% = 8.9$

$100\% = \$890$ ①

24.

a) i) $\bar{x} = 26.85$ ①

ii) $s_x = 8.05$

Sample standard deviation is used because a sample of 20 days is chosen.

(1 mk for use of either s.d)
1 mk for reason

iii) }
iv) } See attached sheet

v) median = 25 ①

vi) $Q_1 = 20$ $Q_3 = 33$

Interquartile $33 - 20 = 13$ ①

b) i) $AB^2 = 54^2 + 21^2$

$= 2916 + 441$

$= 3357$ ①

(1 mark for $AB^2 = 3357$)

$AB = \sqrt{3357}$

$= 57.9m$ ①

ii) Area ABC = $\frac{1}{2} \times 64 \times 41$

$= 672m^2$

Area ADC = $\frac{1}{2} \times 64 \times 42$

$= 1344m^2$

} ①

(1 mk for area of 10)

Total Area = $1344 + 672$

$= 2016m^2$ ①

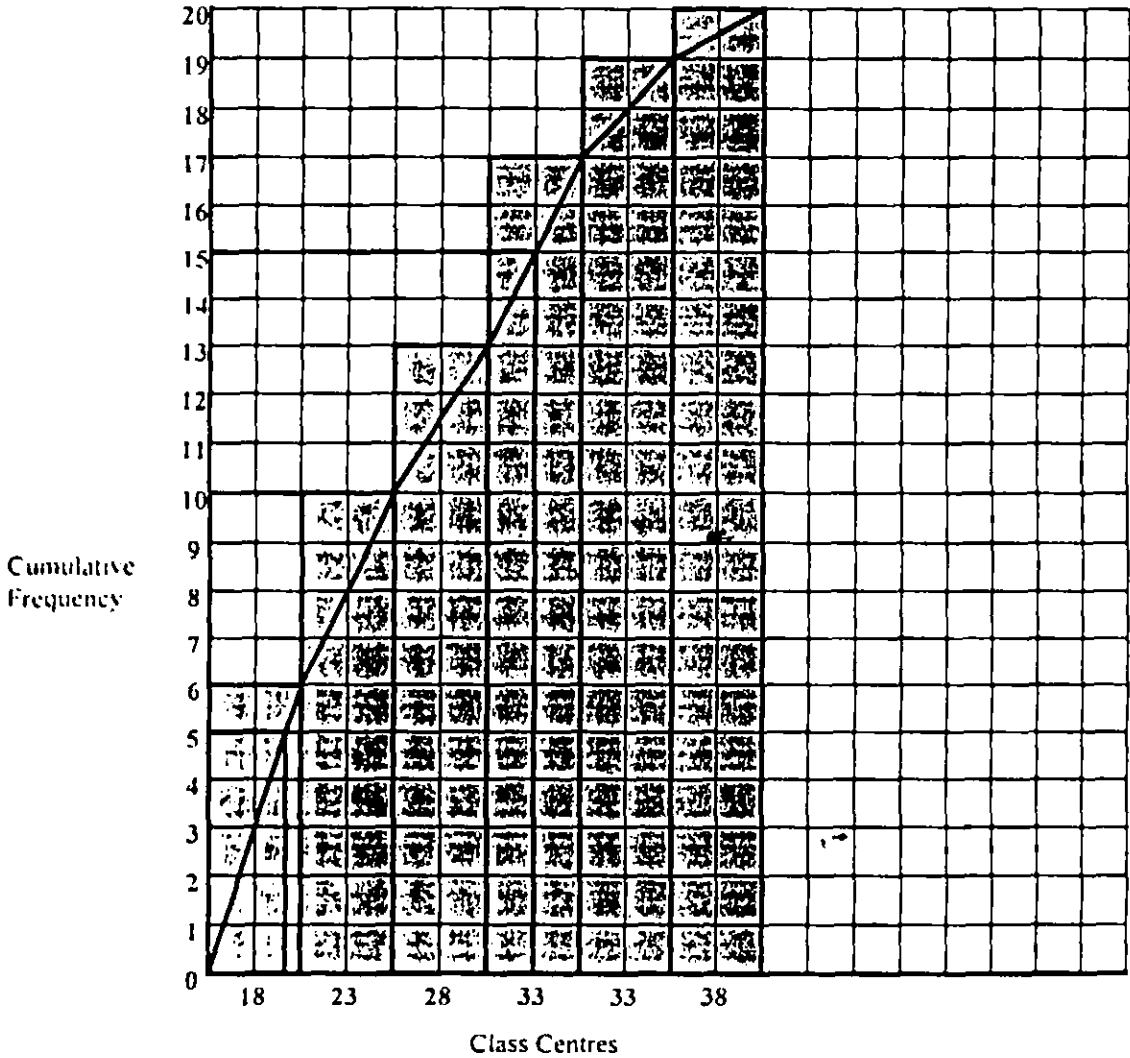
24(a)(ii)

Class	Class Centre	Tally	Frequency	Cumulative Frequency
16 - 20	18		6	6
21 - 25	23		4	10
26 - 30	28		3	13
31 - 35	33		4	17
36 - 40	38		2	19
41 - 45	43		1	20

(1)

(Candidates have 1 mark deducted for each error made)

(iv)



① for ogive

① for histogram