# 9M1 MATHEMATICS TEST

## STATISTICAL MEASURES.
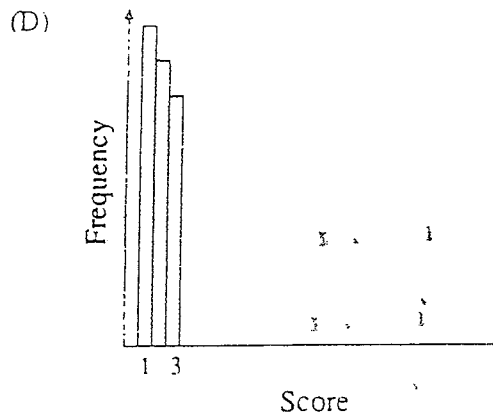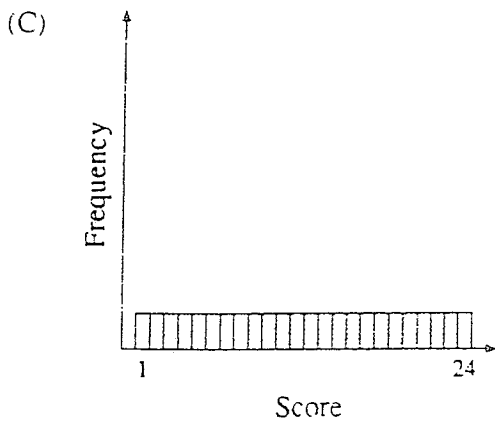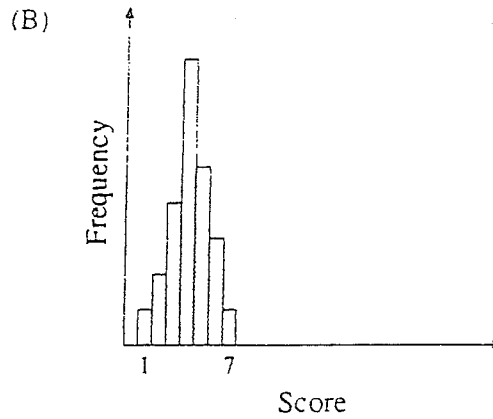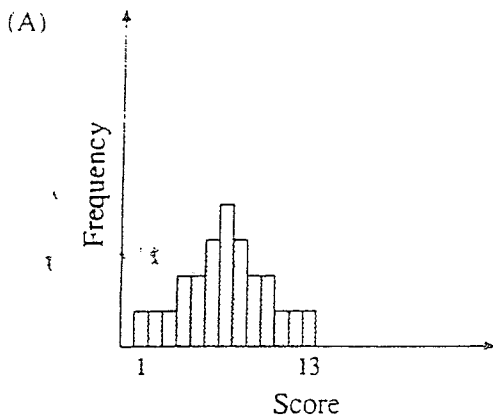
NAME:

## QUESTION 1:

1. The difference between the mode and the median for the scores 13, 12, 4, 13, and 3 is

(A)  1          (B)  3          (C)  4          (D)  9

2. The histograms represent the scores for a class of twenty-four students on four different tests.
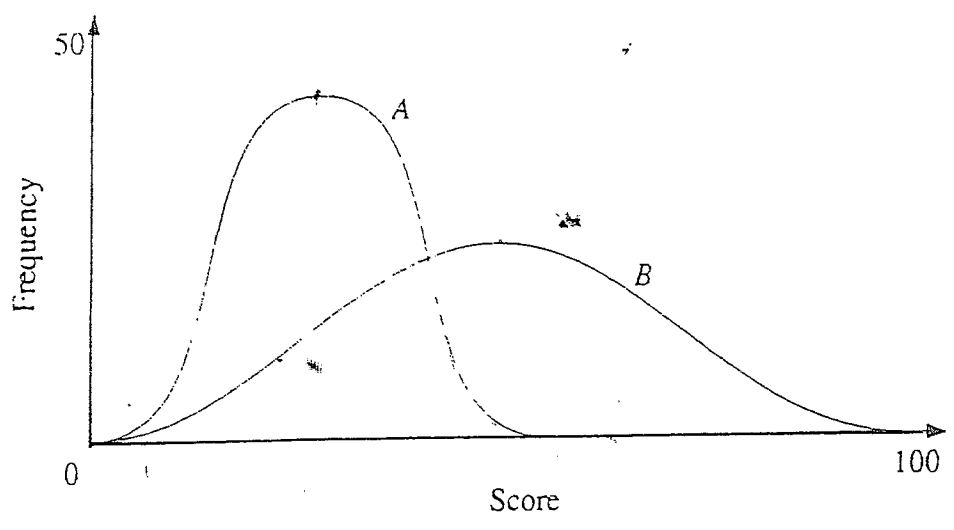
(A)



(B)



(C)



(D)



Which set of scores (A, B, C, or D) has the largest standard deviation?

3.     Find the value of $x$ if the following set of scores has a mean of 6.

| Score | Frequency |
|-------|-----------|
| 4 | 3 |
| 5 | 6 |
| $x$ | 6 |

**4.**



The graph shows the frequency curves for two sets of test results, $A$ and $B$.

$\bar{x}_A$ = mean of $A$        $\sigma_A$ = standard deviation of $A$

$\bar{x}_B$ = mean of $B$        $\sigma_B$ = standard deviation of $B$

Which of the following is true?

(A)   $\bar{x}_A > \bar{x}_B$   and   $\sigma_A < \sigma_B$

(B)   $\bar{x}_A < \bar{x}_B$   and   $\sigma_A > \sigma_B$

(C)   $\bar{x}_A < \bar{x}_B$   and   $\sigma_A < \sigma_B$

(D)   $\bar{x}_A > \bar{x}_B$   and   $\sigma_A > \sigma_B$

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**5.**   A music store sells blank cassettes in packs that contain either 1, 2, 3, 4, or 5 cassettes.  The histogram below shows the sales for one week.
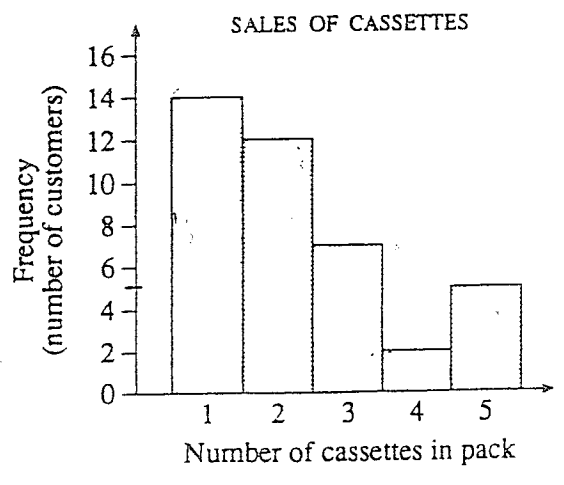


SALES OF CASSETTES

Find the mean number of cassettes sold to each customer.

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**6.**   For this set of scores, find the standard deviation correct to one decimal place:

| score | frequency |
|-------|-----------|
| 6     | 4         |
| 7     | 5         |
| 8     | 7         |
| 9     | 6         |
| 10    | 3         |

**7.**

| score | frequency |
|-------|-----------|
| 11 | 5 |
| 12 | 4 |
| 13 | 1 |
| 14 | 6 |
| 15 | 4 |

A score of 13 is added to this sample. Which measure will change?

(A) median      (B) range

(C) mode      (D) mean

**8.** The same class sat for tests in English, Mathematics and Science.

Esti's results are shown below:

| TEST | CLASS MEAN | CLASS STANDARD DEVIATION | ESTI'S MARK |
|------|-----------|--------------------------|-------------|
| ENGLISH | 75 | 5 | 80 |
| MATHEMATICS | 55 | 15 | 80 |
| SCIENCE | 60 | 10 | 80 |

In which test did Esti perform best, compared to the rest of her class?

(A) English      (B) Mathematics

(C) Science      (D) She performed as well in all three tests

**9.** Suzie has an average mark of 60 for 6 tests. There are only two more tests, both out of 100.

What is the highest average Suzie could have after all the tests are completed?
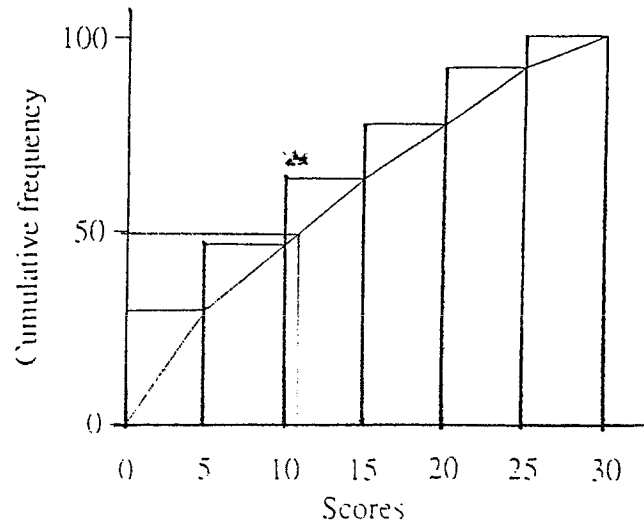
(A) 70      (B) 80      (C) $86\frac{2}{3}$      (D) $93\frac{1}{3}$

**10.**
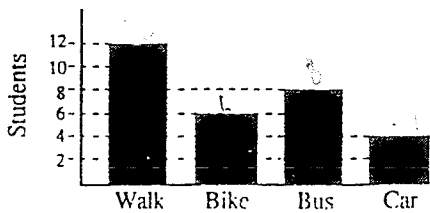


This column graph shows how class 10M travel to school.
The information is to be represented on a sector graph.

Calculate the size of the angle in the sector representing travel by bus.

**11.** The graph shows a cumulative frequency histogram and polygon.



Which of the following is true?

(A) The median is less than 15.

(B) The mode is 30.

(C) The range is 100.

(D) More than half of the scores are over 50.

**12.** Gai has been playing soccer for six years and has recorded her goal-scoring record. Over these years Gai scored 8, 7, 4, 8, 6, 3 goals.

(a) (i) Calculate Gai's mean number of goals.
 (ii) Find the range and the mode.
 (iii) Find the median.

(b) In her seventh year of soccer Gai struck brilliant form to score 13 goals.

How will this affect Gai's mean and median?

(c) After 8 years, Gai's mean number of goals slumps to 6.5. How many goals did she score in her eighth year?

**13.**

PERCENTAGE OF THE AUSTRALIAN POPULATION IN AGE GROUPS

| Age (years) | Percentage |
|---|---|
| 0 – 15 | 22% |
| 16 – 64 | 66% |
| 65 and over | 12% |

A bar graph representing this information has been started below.

By calculation and measurement, complete the graph.

3.25 cm (22%)          9.75 cm (66%)          1 77cm (12%)

| 0 – 15 years | 16 – 64 years | 65+ years |
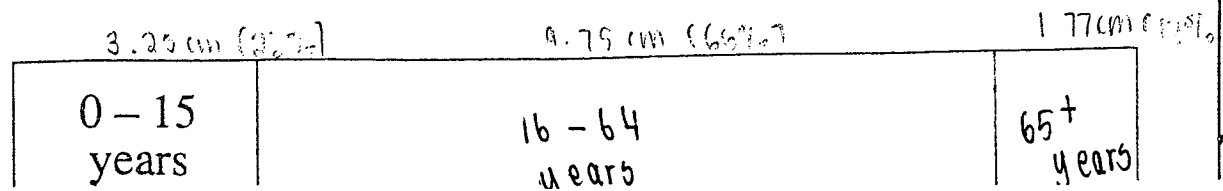
**14.**
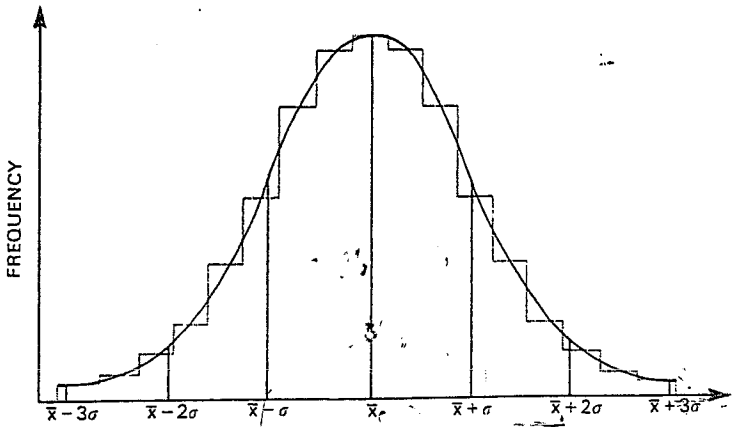


A company produces a metal pipe which has a mean length of 20 cm and a standard deviation of 0.03 cm. If the lengths form a normal distribution, what percentage of the pipes would have a length

(a) from 19.97 to 20.03 cm

(b) from 19.94 to 20.06 cm

(c) more than 20.09 cm

(d) less than 20.06 cm

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**15.** A manufacturer of electric light bulbs which have a mean life of 1500 hours and a standard deviation of 250 hours guarantees that his bulbs will last 1000 hours or more. What percentage of bulbs would fail to satisfy the guarantee?     1500-20

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**16.**

| Class | Class centre (x) | Tally | Frequency (f) | Cumulative frequency (c.f.) | x ×f |
|---|---|---|---|---|---|
| 25 – 29 | | IIII | 5 | | |
| 30 – 34 | | I | 1 | | |
| 35 – 39 | | IIII | 4 | | |
| 40 – 44 | | II | 2 | | |
| 45 – 49 | | II | 2 | | |
| 50 – 54 | | IIII | 4 | | |
| 55 – 59 | | II | 2 | | |
| 60 – 64 | | IIII I | 6 | | |
| 65 – 69 | | II | 2 | | |
| 70 – 74 | | II | 2 | | . . . |
| | | Σ | | Σ | |

(a) Complete the table above

(b) Hence find the mean score.

(c) Find the modal class.

(d) Find the median class.

(b)

(c)

(d)

| | ANSWER |
|---|---|

**17.** For the stem and leaf plot find the
a  mean,
b  mode,
c  median,
d  range.

| stem | leaves |
|------|--------|
| 2 | 2336 |
| 3 | |
| 4 | 123556668 |
| 5 | 1557777 |
| 6 | 12355567 |
| 7 | 00 |

(a)
(b)
(c)
(d)

**18.** Find the interquartile range.
37

| Stem | Leaves |
|------|--------|
| 85 | 5845342 |
| 86 | 1211123476 |
| 87 | 23484513699 |
| 88 | 536874303 |

**19.** From the following box and whisker plot , find the
i   range $55 - 49 = 6$
ii  upper quartile 54
iii lower quartile 50
iv  interquartile range 4
v   median. 52

a



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48  49  50  51  52  53  54  55
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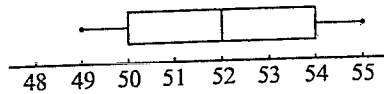
(i)
(ii)
(iii)
(iv)
(v)

**20.** The results in a spelling quiz for two students A and B are as below

$(\bar{x})_A = 20$        $(\bar{x})_B = 20$

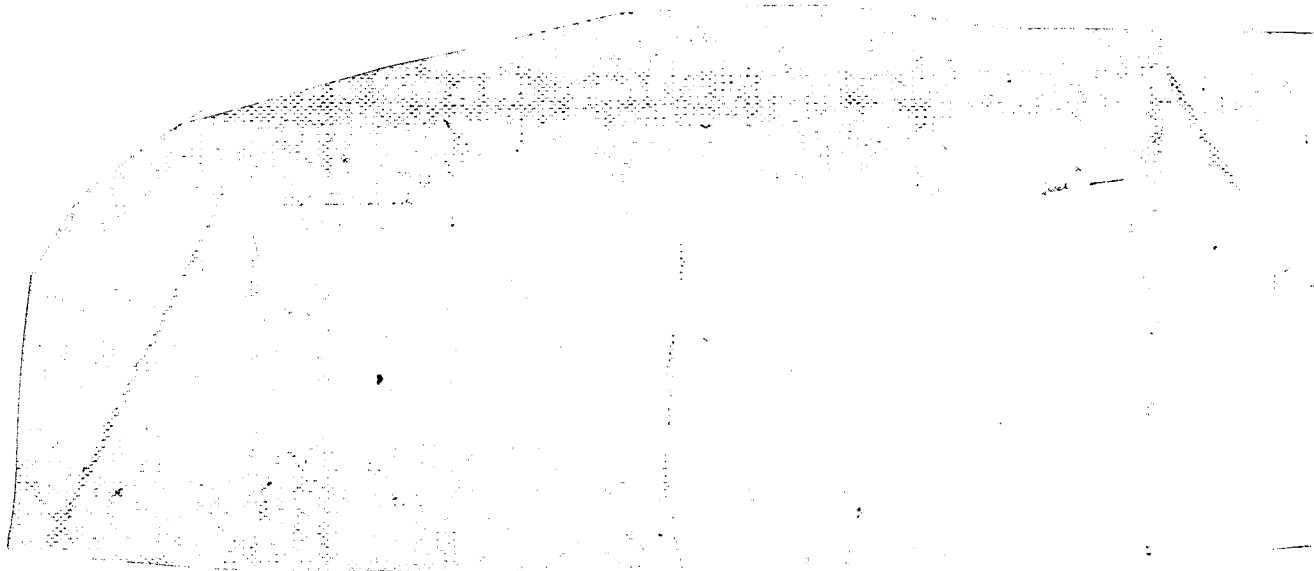$(\sigma_N)_A = 3$        $(\sigma_N)_B = 5$

Comment on the relative performance of A and B in the space below:

# QUESTION 2:

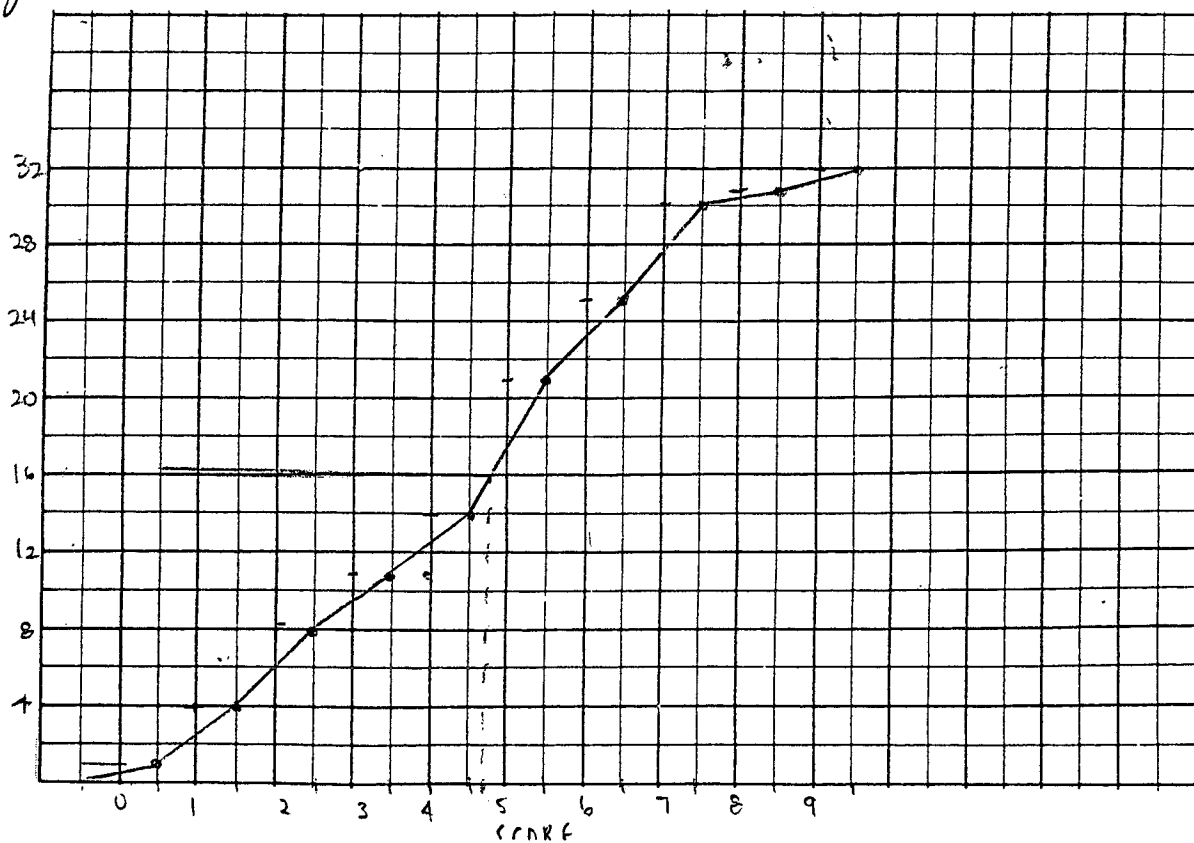(i) Draw a box and whisker plot for the data in this frequency distribution table.

| Score | Frequency | Cumulative Frequency |
|-------|-----------|----------------------|
| 0 | 1 | 1 |
| 1 | 3 | 4 |
| 2 | 4 | 8 |
| 3 | 3 | 11 |
| 4 | 3 | 14 |
| 5 | 7 | 21 |
| 6 | 4 | 25 |
| 7 | 5 | 30 |
| 8 | 1 | 31 |
| 9 | 1 | 32 |

(ii) For the data above, draw an ogive and find the median from its.
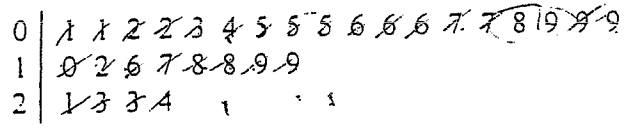
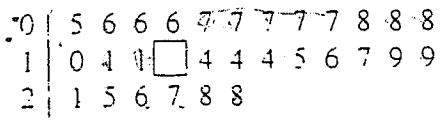Median is
$\doteqdot 4.75 \rightarrow 5$

A survey was conducted on year 10 students in two different schools to compare their preparation for their external exams by comparing the average number of hours spent by students on their study each week.
Thirty students were randomly chosen from each school  The average number of study hours by each student is shown in the stem and leaf plots

RAWSON STREET SCHOOL

```
0 | 1 1 2 2 3 4 5 5 5 6 6 6 7 7 8 9 9 9
1 | 0 2 6 7 8 8 9 9
2 | 1 3 3 4
```

MATTHEWS STREET SCHOOL

```
0 | 5 6 6 6 7 7 7 7 7 8 8 8
1 | 0 4 4 □ 4 4 4 5 6 7 9 9
2 | 1 5 6 7 8 8
```

a) What was the mode of the average number of hours spent by Matthews St school students on study ?



b) How many students in Matthews St  School spent on average more than 19 hours per week on study?




c) What was the median of the average number of hours spent by Rawson St. School students on study?




d) The average number of study hours of one of the students in Matthews St. School is represented by ☐  Give a possible number for ☐ .



e) Which of these two schools is the more academic school? Give reasons for your answer