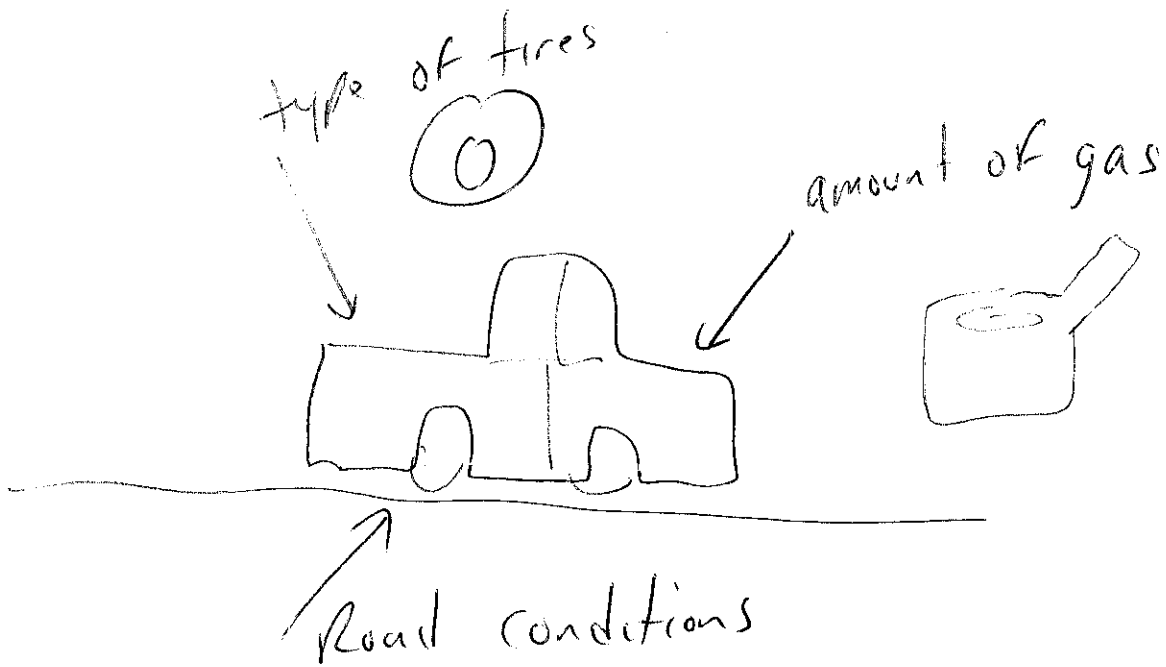


Name: \_\_\_\_\_

The amount of distance a vehicle can travel depends on the following: (5 marks)

- amount of gas
- type of tires
- road conditions

25) Construct a mind map that shows the relationship between the independent and dependent variables. As well identify at least one independent and one dependent variable.



dependent  
distance  
travelled

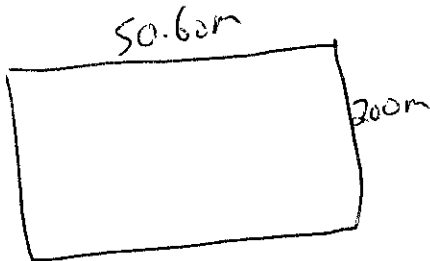
Independent  
type of tires  
amount of gas  
road conditions

Name: \_\_\_\_\_

26) The dimensions of a rectangular playground are 50.60m by 200m.

a) What is the number of significant digits for each measurement? (2 marks)

50.60  $\rightarrow$  4 sig dig's  
 200  $\rightarrow$  1 sig dig



b) Calculate the perimeter of the playground. Record the answer using the correct level of precision. (3 marks)

$$P = 50.60 + 50.60 + 200 + 200 =$$

$$P = 501.20 \text{ or reported correctly } 501\text{m}$$

c) Calculate the area of the playground. Record the answer using the correct level of precision. (3 marks)

$$A = L \times w$$

$$A = 50.60 \times 200 = 10120$$

or reported correctly 10,000 m<sup>2</sup>

Name: \_\_\_\_\_

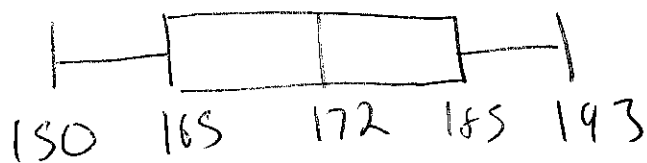
27) The following table below displays the heights of 19 Level I boys.

| L1  |
|-----|
| 150 |
| 156 |
| 158 |
| 159 |
| 165 |
| 165 |
| 169 |
| 170 |
| 170 |
| 172 |
| 173 |
| 174 |
| 175 |
| 176 |
| 185 |
| 186 |
| 186 |
| 192 |
| 193 |

$Q1 = 165$   
 median = 172  
 $Q3 = 185$

- a) Draw a box whisker of the above data. Show all calculations and use the graphing calculator to verify your answer. (6 marks)

data is sorted



Name: \_\_\_\_\_

b) Draw a stem-leaf plot of the above data. (3 marks)

| Stem | leaf    | Count |
|------|---------|-------|
| 15   | 0689    | 4     |
| 16   | 559     | 3     |
| 17   | 0023456 | 7     |
| 18   | 566     | 3     |
| 19   | 23      | 2     |

c) Complete a frequency table of the above data. (4 marks)

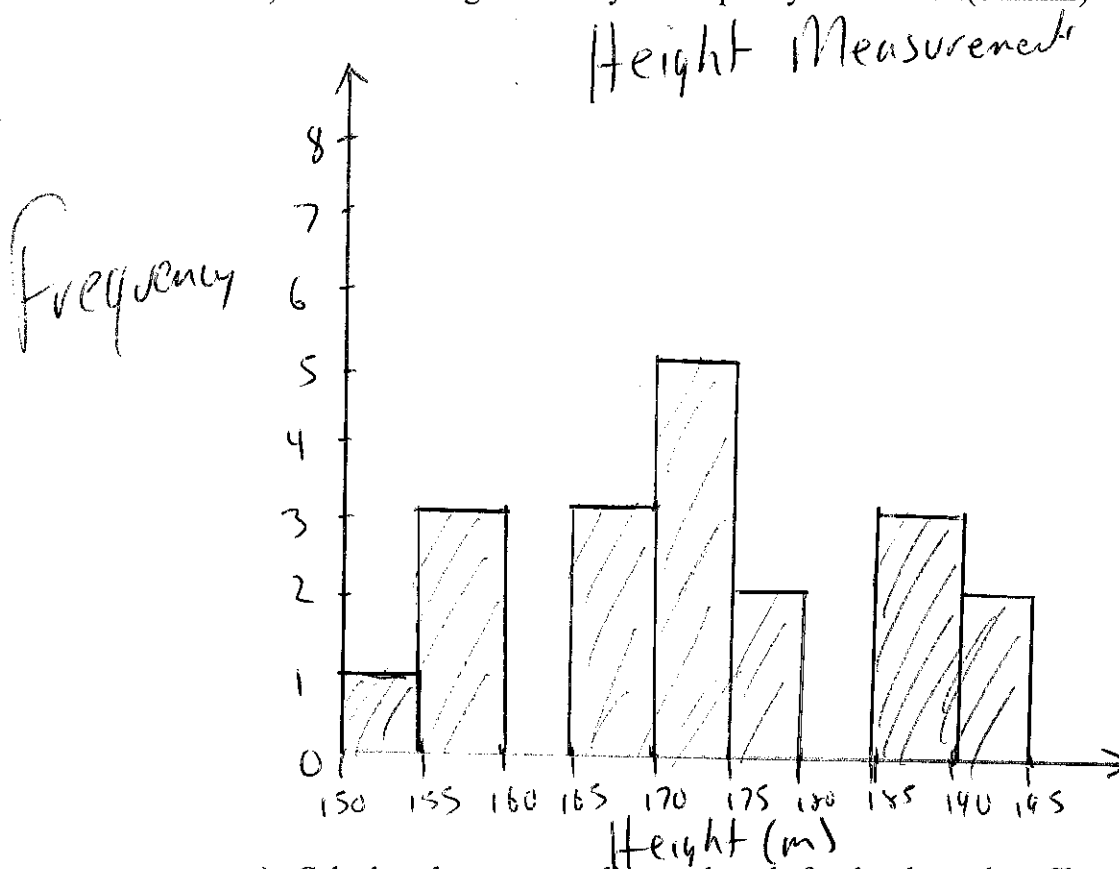
$$\text{Range} = 195 - 150 = 45 \quad \frac{45}{5} = 9 \checkmark$$

Frequency table for height

| Bin     | Frequency |
|---------|-----------|
| 150-155 | 1         |
| 155-160 | 3         |
| 160-165 | 0         |
| 165-170 | 3         |
| 170-175 | 5         |
| 175-180 | 2         |
| 180-185 | 0         |
| 185-190 | 3         |
| 190-195 | 2         |

Name: \_\_\_\_\_

d) Draw a histogram from your frequency table above. (6 marks)



e) Calculate the mean, median, and mode for the above data. Show all calculations and use the graphing calculator to verify your answer. (4 marks)

$$150 + 156 + 158 + 159 + 165 + 165 + 169 + 170 + 170 + 172 + 173 + 174 + 175 + 176 + 185 + 186 + 186 + 192 + 193 = 3098$$

$$\bar{x} = \frac{3274}{19} = 172.3 \quad \text{Med} = 172$$

$$\text{Mode} = 165, 170, 186.$$

Name: \_\_\_\_\_

- f) Which measure of central tendency best describes the average height? Give reasons for your answer. (2 marks)

The Mean would be the measure as there is no outlier, as well the data appears reasonably close together.

- g) Calculate the standard deviation for the data above. Show all calculations and use the graphing calculator to verify your answer. (8 marks)

|                     |                      |
|---------------------|----------------------|
| 150 - 172.3 = -22.3 | $(-22.3)^2 = 497.29$ |
| 156 - 172.3 = -16.3 | $(-16.3)^2 = 265.69$ |
| 158 - 172.3 = -14.3 | $(-14.3)^2 = 204.49$ |
| 159 - 172.3 = -13.3 | $(-13.3)^2 = 176.89$ |
| 165 - 172.3 = -7.3  | $(-7.3)^2 = 53.29$   |
| 165 - 172.3 = -7.3  | $(-7.3)^2 = 53.29$   |
| 169 - 172.3 = -3.3  | $(-3.3)^2 = 10.89$   |
| 170 - 172.3 = -2.3  | $(-2.3)^2 = 5.29$    |
| 172 - 172.3 = -0.3  | $(-0.3)^2 = 0.09$    |
| 173 - 172.3 = 0.7   | $(0.7)^2 = 0.49$     |
| 174 - 172.3 = 1.7   | $(1.7)^2 = 2.89$     |
| 175 - 172.3 = 2.7   | $(2.7)^2 = 7.29$     |
| 176 - 172.3 = 3.7   | $(3.7)^2 = 13.69$    |
| 185 - 172.3 = 12.7  | $(12.7)^2 = 161.29$  |
| 186 - 172.3 = 13.7  | $(13.7)^2 = 187.69$  |
| 186 - 172.3 = 13.7  | $(13.7)^2 = 187.69$  |
| 192 - 172.3 = 19.7  | $(19.7)^2 = 388.09$  |
| 193 - 172.3 = 20.7  | $(20.7)^2 = 428.49$  |

$$\frac{2650.11}{19} = 139.48$$

$$\sqrt{139.48} = 11.8$$

$$\sigma_x = 11.8$$

- h) Would you consider the data as clustered? Use the answer you determined in (g) as a part of your answer. (2 marks)

2650.11

The range of the data is  $193 - 150 = 43$  with a standard deviation of 11.8. The standard deviation shows that the data is somewhat spread out because it is relatively large. As a result there is not much clustering in the data.

Name: \_\_\_\_\_

28) A survey of 10,000 people produced the following information.

-The mean distance a person walked daily was 2 km

-The standard deviation was 0.5 km.

- a) Within what range of values would a typical family walk? What is this range of values known as? (3 marks)

$$\bar{x} = 2 \quad \sigma_x = 0.5$$

95% range

$$2 - 1 = 1$$

$$2 + 1 = 3$$

Members of a typical family would walk between 1 km and 3 km each

- b) Dan walks 3.5 km every day. Would this value be considered an outlier? Why or why not? (3 marks)

Dan is an outlier because he is above 3 km, or outside the 95% range.

Name: \_\_\_\_\_

29) Multiply all possible combinations of the matrices you see below. Show all workings (16 marks)

$$[A] = \begin{bmatrix} 9 & 3 & 7 \\ 5 & 7 & 6 \\ 9 & 4 & 3 \end{bmatrix} \quad [B] = \begin{bmatrix} 6 & 4 & 2 \\ 1 & 3 & 3 \end{bmatrix} \quad [C] = \begin{bmatrix} 9 & 3 \\ 7 & 5 \\ 7 & 6 \end{bmatrix} \quad [D] = \begin{bmatrix} 9 & 3 \\ 7 & 5 \end{bmatrix}$$

$3 \times 3$                        $2 \times 3$                        $3 \times 2$                        $2 \times 2$

all can be multiplied

$$[A] \times [C] = \begin{bmatrix} 9 & 3 & 7 \\ 5 & 7 & 6 \\ 9 & 4 & 3 \end{bmatrix} \times \begin{bmatrix} 9 & 3 \\ 7 & 5 \\ 7 & 6 \end{bmatrix} = \begin{bmatrix} 9 \times 9 + 3 \times 7 + 7 \times 7 & 9 \times 3 + 3 \times 5 + 7 \times 6 \\ 5 \times 9 + 7 \times 7 + 6 \times 7 & 5 \times 3 + 7 \times 5 + 6 \times 6 \\ 9 \times 9 + 4 \times 7 + 3 \times 7 & 9 \times 3 + 4 \times 5 + 3 \times 6 \end{bmatrix}$$

$$= \begin{bmatrix} 151 & 84 \\ 136 & 86 \\ 130 & 65 \end{bmatrix}$$

$$[B] \times [A] = \begin{bmatrix} 6 & 4 & 2 \\ 1 & 3 & 3 \end{bmatrix} \times \begin{bmatrix} 9 & 3 & 7 \\ 5 & 7 & 6 \\ 9 & 4 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} 6 \times 9 + 4 \times 5 + 2 \times 9 & 6 \times 3 + 4 \times 7 + 2 \times 4 & 6 \times 7 + 4 \times 6 + 2 \times 3 \\ 1 \times 9 + 3 \times 5 + 3 \times 9 & 1 \times 3 + 3 \times 7 + 3 \times 4 & 1 \times 7 + 3 \times 6 + 3 \times 3 \end{bmatrix}$$

$$= \begin{bmatrix} 92 & 54 & 72 \end{bmatrix}$$

$$[B] \times [C] = \begin{bmatrix} 6 & 4 & 2 \\ 1 & 3 & 3 \end{bmatrix} \times \begin{bmatrix} 9 & 3 \\ 7 & 5 \\ 7 & 6 \end{bmatrix}$$

$$= \begin{bmatrix} 6 \times 9 + 4 \times 7 + 2 \times 7 & 6 \times 3 + 4 \times 5 + 2 \times 6 \\ 1 \times 9 + 3 \times 7 + 3 \times 7 & 1 \times 3 + 3 \times 5 + 3 \times 6 \end{bmatrix}$$

$$= \begin{bmatrix} 96 & 50 \end{bmatrix}$$

$$[C] \times [D] = \begin{bmatrix} 9 & 3 \\ 7 & 5 \\ 7 & 6 \end{bmatrix} \times \begin{bmatrix} 9 & 3 \\ 7 & 5 \end{bmatrix}$$

$$= \begin{bmatrix} 9 \times 9 + 3 \times 7 & 9 \times 3 + 3 \times 5 \\ 7 \times 9 + 5 \times 7 & 7 \times 3 + 5 \times 5 \\ 7 \times 9 + 6 \times 7 & 7 \times 3 + 6 \times 5 \end{bmatrix}$$

$$= \begin{bmatrix} 102 & 42 \\ 98 & 46 \\ 105 & 51 \end{bmatrix}$$



Name: \_\_\_\_\_

- 30) The following are tables to represent the amount of shoveling that two young men in Postville did last winter and how much they charged their customers.

|             | Cost (\$) |
|-------------|-----------|
| Driveways   | 40        |
| Small Roofs | 30        |
| Large roofs | 20        |

|        | Driveways | Small Roofs | Large Roofs |
|--------|-----------|-------------|-------------|
| Trevor | 10        | 5           | 9           |
| Grant  | 7         | 10          | 6           |

Using matrix multiplication, create a matrix (with rows and columns labeled appropriately) to show which person made the most money last week. (6 marks)

$$\begin{bmatrix} 10 & 5 & 9 \\ 7 & 10 & 6 \end{bmatrix} \begin{bmatrix} 40 \\ 30 \\ 20 \end{bmatrix} = \begin{bmatrix} 10 \times 40 + 5 \times 30 + 9 \times 20 \\ 7 \times 40 + 10 \times 30 + 6 \times 20 \end{bmatrix}$$

$2 \times 3$                        $3 \times 1$

$$= \begin{matrix} \text{Trevor} \\ \text{Grant} \end{matrix} \begin{bmatrix} 730 \\ 700 \end{bmatrix}$$

\$

Grant made \$30 less than Trevor.  
Trevor made the most money.

Name: \_\_\_\_\_

## Part I: Selected Response

Place your answers on the answer sheet provided for Part I. Do not return the sheets containing the questions for part I.

1) Which statement is not true about significant digits?

- a) Zeros in between nonzero digits are significant.
- b) Zeros to the right of nonzero digits in a decimal number are significant.
- c) Zeros to the left of a nonzero digit in a decimal number are not significant.
- d) Zeros to the left of a nonzero digit in a decimal number are significant.

1,1,2,3,4,4,4,5

2) What is the mean of the above numbers?

- a) 3
- b) 3.5
- c) 4
- d) 24

1,1,2,3,4,4,4,5

3) What is the median of the above numbers?

- a) 3
- b) 3.5
- c) 4
- d) 24

1,1,2,3,4,4,4,5,

4) What is the mode of the above numbers?

- a) 3
- b) 3.5
- c) 4
- d) 24

5) What is the range of the above numbers?

- a) 3
- b) 3.5
- c) 4
- d) 24

Name: \_\_\_\_\_

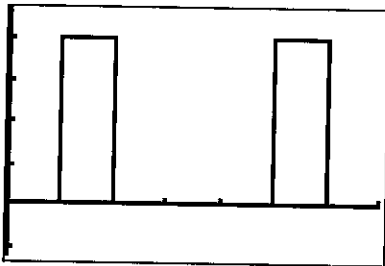
- 6) Which statement is not true about measures of central tendency?
- a) The mean is the best measure when the data points are really close together.
  - b) The median is the best when there are no outliers.
  - c) There can be more than one mode in a list of data
  - d) There can be no mode in a list of data.

- 7) Which statement is true about box whisker plots?

- a) 50% of the data lies inside the quartiles.
- b) 25% of the data lies outside the quartiles.
- c) 100% of the data lies inside the quartiles.
- d) 75% of the data lies inside the quartiles.

- 8) What is standard deviation?

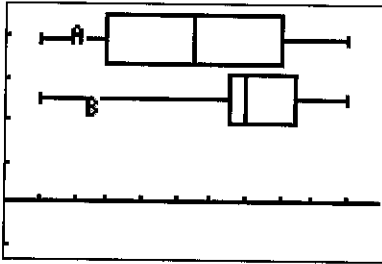
- a) A measure of central tendency.
- b) An average.
- c) A line of best fit?
- d) A measure of variation.



- 9) Which standard deviation below best represents the above histogram?

- a) 0
- b) 1
- c) 2
- d) 1,000,000

Name: \_\_\_\_\_



10) Which statement is true for the above box whiskers?

- a) The ranges for the two lists of data are different.
- b) The medians for the two lists of data are the same.
- c) The data is more clustered in B than in A.
- d) The data is more clustered in A than in B.

| List A   | List B   |
|--|--|
| <pre> 1-Var Stats X̄=9 Σx=81 Σx²=789 Sx=2.738612788 σx=2.581988897 ↓n=9 </pre> | <pre> 1-Var Stats X̄=9 Σx=81 Σx²=761 Sx=2 σx=1.885618083 ↓n=9 </pre> |

11) The above screens are calculations for 2 lists, List A and List B. Which statement is true?

- a) There is more data in list A than in list B
- b) List B has less variation than List A
- c) List A has a greater mean than List B
- d) List B has greater variation than List A.

Name: \_\_\_\_\_

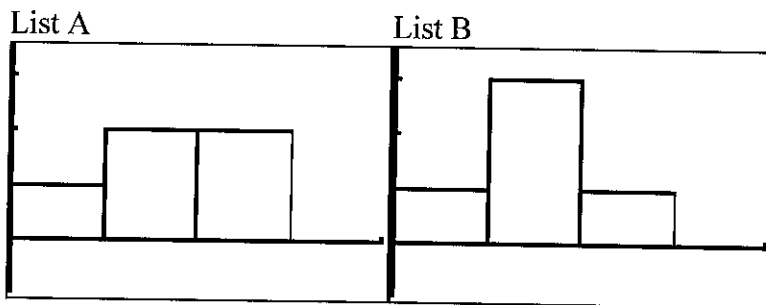
| L1                    | L2                    | L3                        | 3 |
|-----------------------|-----------------------|---------------------------|---|
| 1<br>2<br>3<br>4<br>5 | 1<br>2<br>3<br>4<br>5 | 1<br>1.5<br>2<br>2.5<br>3 |   |
| -----                 |                       |                           |   |
| L3(6) =               |                       |                           |   |

12) The following are 3 lists of data. Which statement is true?

- a) List 1,2,3 all have the same standard deviation.
- b) List 1 has the greatest standard deviation.
- c) List 2 has the greatest standard deviation.
- d) List 3 has the greatest standard deviation.

13) Which statement is true about normally distributed data?

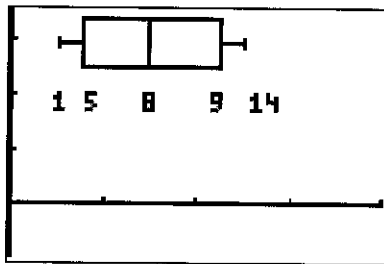
- a) 68% of all data lies within 1 standard deviation of the mean.
- b) 95% of all data lies within 1 standard deviation of the mean.
- c) The shape of a frequency polygon for normally distributed data is not bell shaped.
- d) The histogram does not look symmetrical.



14) The above screens are histograms of 2 lists, List A and List B. Both lists have the same range. Which statement is true?

- a) List A is more clustered than List B
- b) List B is more clustered than List A
- c) Neither list has any clustering.
- d) Both lists contain the same numbers.

Name: \_\_\_\_\_



15) Which numbers are <sup>possible</sup> outliers?

- a) 5 & 8
- b) 1 & 14
- c) 1 & 5
- d) 9 & 14

16) Which number is the typical value labeled in the above box whisker?

- a) 8
- b) 5
- c) 14
- d) 9

17) What is the range in which 50% of the data lies in the above box whisker?

- a) 1 & 9
- b) ~~1 & 9~~ 5 & 9 ← fix
- c) 8 & 9
- d) 1 & 14

18) Which statement is true about normally distributed data?

- a) The data size is small.
- b) The data size is large.
- c) The data size does not matter at all.
- d) The data is not symmetrical about the middle.

Name: \_\_\_\_\_

$$\begin{bmatrix} 9 & 3 & -7 & -5 \\ -7 & -6 & -9 & -4 \\ 3 & -2 & 6 & -3 \end{bmatrix}$$

19) For the above matrix, what are the dimensions?

- a) 3x3
- b) 4x4
- c) 4x3
- d) 3x4

20) What does the element 1,3 in a matrix mean?

- a) The element is in the 3rd row and 1st column.
- b) The element is in the 2nd row and 1st column.
- c) The element is in the 1st row and 3rd column.
- d) There are no elements in a matrix.

21) Which of the following are dimensions of a square matrix?

- a) 3x4
- b) 4x3
- c) 2x3
- d) 10x10

$$\begin{bmatrix} 2 & 3 & 1 \\ 0 & 5 & 6 \\ 2 & 5 & 0 \end{bmatrix}$$

22) Which of the following is false about the above matrix.

- a) The element 2,1 is a 3.
- b) The element 3,3 is a 0.
- c) The element 5,5 is not in this matrix.
- d) The matrix is square.

Name: \_\_\_\_\_

23) Matrix A is a 2 by 3 matrix and matrix B is a 5 by 2. What is true about the following matrices?

$2 \times 3$     $5 \times 2$     $2 \times 2$     $5 \times 2$     $A$     $2 \times 3$

- a) Matrix A can be multiplied to matrix B.
- b) Matrix B can be multiplied to matrix A.
- c) The matrices can be multiplied in any order.
- d) Matrix multiplication is impossible for any combination of these matrices.

24) What are the dimensions of the product matrix when a 3 by 2 and a 2 by 5 are multiplied?

$3 \times 2$     $2 \times 5$

- a) 3 by 2
- b) 2 by 2
- c) 3 by 5
- d) 2 by 5

|    |   |    |   |
|----|---|----|---|
| 1  | d | 13 | a |
| 2  | a | 14 | b |
| 3  | b | 15 | b |
| 4  | c | 16 | a |
| 5  | c | 17 | b |
| 6  | b | 18 | b |
| 7  | a | 19 | d |
| 8  | d | 20 | c |
| 9  | c | 21 | d |
| 10 | c | 22 | a |
| 11 | b | 23 | b |
| 12 | d | 24 | c |