



Mission Heights Junior College

Year 9 Examination 2019

Subject: Mathematics

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

## Mountains Whanau

### Instructions:

Time allowed for this examination is 1 and a half hours.

You should attempt all the required questions in this examination. You are allowed to use a calculator.

Start writing when you are instructed to do so. You have 5 minutes of reading time before you start writing.

Use the space provided after each question to write all your answers with **the working shown very clearly**. If you need extra writing sheets then ask your teacher. Round your answers to 2 dp where applicable. Use only black or blue pen to write the paper. Use pencil only to draw the graph and diagrams.

Check that this booklet has pages 1-18 in the correct order and a separate planning sheet.

**YOU MUST HAND THIS BOOKLET TO THE TEACHER AT THE END OF THE TEST.**

Working Towards	AT	ABOVE	BEYOND

## Mountains Year 9 Mathematics Exam: WAME

Section/Strand	Working Towards	AT	ABOVE	Beyond
A-Number				
B-Algebra and graphs				
C-Statistics				
<b>Examination Conditions</b>	You have completed this assessment, however, you did not adhere to Examination conditions.	You have completed this assessment, however, you did not adhere to Examination conditions.	You have completed this assessment, adhering to Examination conditions.	You have completed this assessment, adhering to Examination conditions.

## Section A: Number -

The questions in this section of the examination are about Mission Heights College

### QUESTION ONE

Calculate the following:

(i)  $12 \times -4 =$

\_\_\_\_\_ (AT)

(ii)  $11 - -7 =$

\_\_\_\_\_ (AT)

(iii)  $(-4)^2 =$

\_\_\_\_\_ (AB)

(iv)  $-2(5 + 2) - 5(4 - 1) =$

\_\_\_\_\_ (AB)

(v)  $20 + 6(9 - 7)^2 + 7 =$

\_\_\_\_\_ (TAAB)

### QUESTION TWO

(a) The school boiler is switched on at 5am in the morning. At this time the temperature of the college theatre was  $-2$  degrees. By 9am the temperature of the theatre had increased by 20 degrees. What was the temperature of the hall at 9am? (AT)

\_\_\_\_\_  
\_\_\_\_\_

(b) There are 8 year 9 form classes at the college. The number of students in each form class is as follows. 9M1 = 25, 9M2 = 27, 9W1 = 26, 9W2 = 22, 9F1 = 26 9F2=28, 9C1=30,9C2=28. How many students are there at the college

(AT)

\_\_\_\_\_  
\_\_\_\_\_

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(c) Every day students are in class for a total of 300 minutes. Each day students have 5 different classes. How many minutes do they have per class? **(AT)**

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(d) The college caretaker Wilbert works Monday to Friday. He starts work at 6 am in the morning and finishes at 4.30 pm. He is paid \$28.50 an hour. Calculate his weekly pay. **(AB)**

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(e) In winter, the caretaker spends  $\frac{2}{5}$  of his day keeping the boiler working to heat the school. How many minutes a day is he working on the boiler? (Use the information in question “d” to help answer this) **(TAAB)**

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(f) Two Whanau at Mission Heights Junior College are taking part in a competition which includes students in years 8, 9 and 10. There are 1296 students in these two whanau. The ratio of students in years 8, 9 and 10 is 5: 4: 3. How many students are in year 9? **(TAAB)**

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(g) Matua Brent is taking 640 students and 62 teachers to the local Marae to participate in a Haka celebration. All of the students and teachers need to be transported to the local Marae. The school will use buses to transport both the students and teachers. The buses can fit either 42 or 48 people. Find the smallest number of buses the school could use. You must show your calculations and state the number of 42 seater and 48 seater buses the school could use. (TAAB)

**QUESTION THREE**

Out of the 640 students who took part in Haka celebration 12.5% of the students at the college are International students.

- A. Write 12.5 % as a decimal. \_\_\_\_\_ (AT)
- B. How many of the 640 students at the College are International students?  
\_\_\_\_\_ (AT)
- C. Last year the school received \$1 016800 from International students fees. Each International student paid \$12 400. How many international students were at the college last year?  
\_\_\_\_\_ (AT)
- D. The college is using some of the international fees to provide resources for a new Special Education Learning Centre. \$25,000 was invested into a high interest savings account which earns 4.5 % compound interest per year. Calculate the value of the investment account at the end of three years. ( I = PRT ) (AB)

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(E)The new Special Education Learning Centre will cost \$1.65 million dollars to build. The college needs to save some of the yearly government funding it receives and fundraise to pay for the centre.

- The college will save one sixth of its \$750 000 yearly funding for each of the next three years.
- The Ministry of Education will give the college an extra \$1.2 million dollars for the project.
- All of the 640 students will participate in a workday, raising \$30 each.
- The school will receive a grant from the lotteries commission that equals one half of the amount of the students fundraising.

Will the school be able to afford to build the Special Education Learning Centre at the end of the next 3 years? (You must show your working and clearly communicate what you are calculating at each step.) **(TAAB)**

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**QUESTION FOUR**

(a) The proportions of the colleges funding spent on building repairs over the last 6 years are listed below. List these in order from smallest to largest.

0.23, 0.31, 0.256, 0.301, 0.09, 0.204

\_\_\_\_\_ (AT)

(b) Add the proportions together and round your answer to 1 decimal place.

\_\_\_\_\_  
\_\_\_\_\_ (AT)

### QUESTION FIVE

(a)  $\frac{3}{5} - \frac{2}{3} =$  \_\_\_\_\_

\_\_\_\_\_ (AT)

(b)  $\frac{4}{5} \times \frac{7}{8} =$  \_\_\_\_\_

\_\_\_\_\_ (AT)

(c)  $720 \div \frac{3}{8} =$  \_\_\_\_\_ (AB)

(d)  $\frac{4}{7} + \frac{3}{4} \times \frac{3}{9} =$

\_\_\_\_\_  
\_\_\_\_\_ (AB)

## Section B: Algebra and patterns and graphs

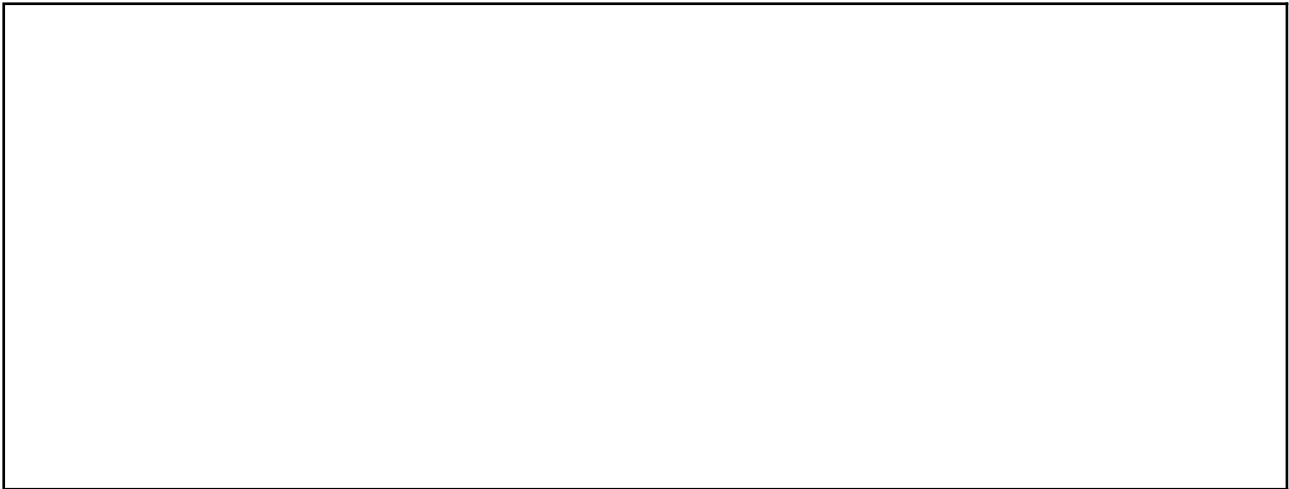
### QUESTION ONE

Below are pictures of hexagon shaped tables with squares seats.



One table can seat 6 students. The tables are joined together to make larger groups.

(a) Draw the seating arrangement for 4 tables and complete the table below (AT)



(b) Complete the table below

(AT)

Number of Tables (T)	Number of Chairs (C)
1	6
2	11
3	16
4	
5	

(c) Complete this equation for the pattern:

T = Number of tables    C = Number of chairs

C = \_\_\_\_\_ (AB)

(d) Use the formula above to calculate the number of chairs that would be needed for 10 tables

\_\_\_\_\_ (AB)

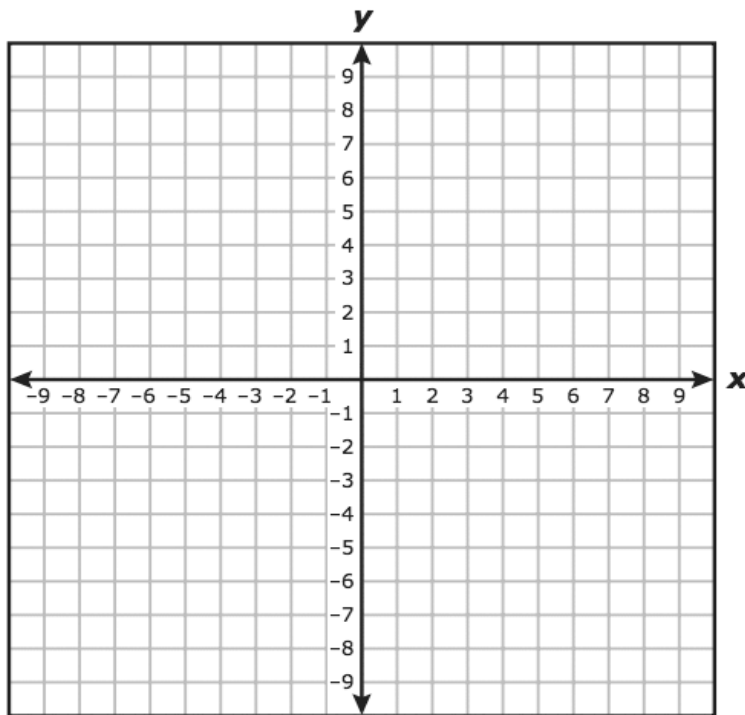
(e) Calculate the number of tables would be needed for 121 chairs.

\_\_\_\_\_  
\_\_\_\_\_ (AB)



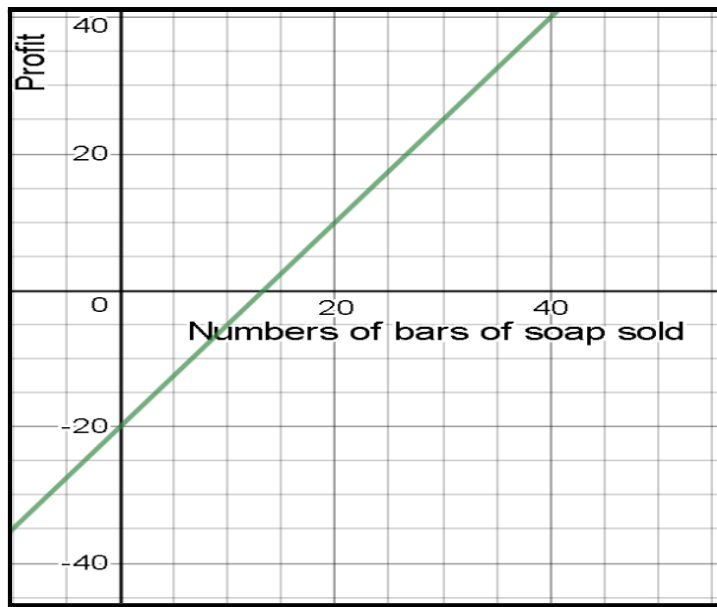
## QUESTION TWO

(a) On the axes below plot the following points then using a ruler join the points up.  
(-3, -6) (-2, -3) (-1, 0) (0, 3) (1, 6) (2, 9) then join the points up (AT)



## QUESTION THREE

The year 10 Business Studies class is making and selling soap. The class has been split into groups. Each group is making and selling a different type of soap. Below is a graph showing the profit of the lavender soap group



(a) How much profit will be made when 30 bars of soap are sold?

\_\_\_\_\_ (AB)

(b) Give a reason for the graph crossing the y axis at negative 20.

\_\_\_\_\_ (AB)

(c) Write the equation of the line.

\_\_\_\_\_ (AB)

(d) The equation of the Cinnamon Soap is  $P = 2b - 30$ . Draw this line on the graph above

(AB)

(e) Using features of the two lines, describe the similarities and differences between the profits of the Lavender and Cinnamon soaps. (TAAB)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

#### QUESTION FOUR

The group making the lavender soap have paid \$45 to hire the soap making equipment. They have calculated that each bar of soap uses \$1.10 worth of ingredients.

(a) Write an equation for the cost of making Lavender soap. Use  $C$  = cost and  $b$  = bars of soap.

\_\_\_\_\_ (AB)

(b) What is the cost of making 50 bars of soap?

\_\_\_\_\_ (AB)

(c) The group have a budget of \$150. How many bars of soap can they make?

\_\_\_\_\_ (AB)

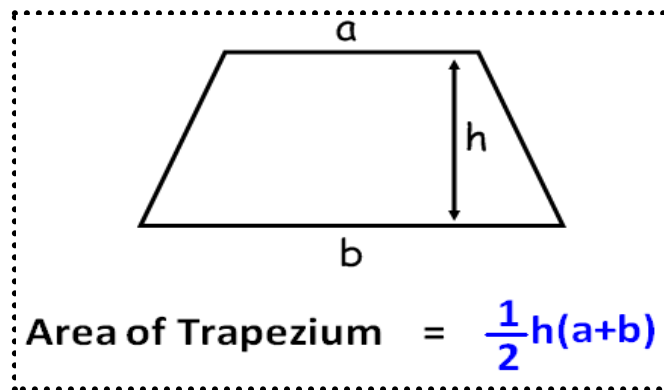
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### QUESTION FIVE

(a) If  $y = 5$  and  $z = 3$  find the value of  $4z - 2y$ .

\_\_\_\_\_ (AT)

(b) The formula for the area of a trapezium is:



$h=10\text{cm}$ ,  $a=4\text{cm}$ ,  $b=8\text{cm}$ .

\_\_\_\_\_ (AB)

\_\_\_\_\_  
\_\_\_\_\_

### QUESTION SIX

Simplify the following

(a)  $5x + 4y - 3x + 2y =$  \_\_\_\_\_ (AT)

(b)  $5p \times 6 =$  \_\_\_\_\_ (AT)

(c)  $w \times w \times w \times w =$  \_\_\_\_\_ (AT)

(d)  $\frac{x^7}{x^3}$  \_\_\_\_\_ (AB)

(e)  $7d \times 6d =$  \_\_\_\_\_ (AT)

(f)  $-4y^3 \times 5y^8 =$  \_\_\_\_\_ (TAAB)

### QUESTION SEVEN

Expand and simplify the following

(a)  $5(y - 7) =$  \_\_\_\_\_ (AT)

(b)  $x(x + 20) =$  \_\_\_\_\_ (AB)

(c)  $8(5x + 5) - 3(2x + 1) =$  \_\_\_\_\_ (TAAB)

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### QUESTION EIGHT

Solve the following equations

(a)  $x + 3 = 21$

\_\_\_\_\_ (AT)

(b)  $\frac{x}{5} = 30$

\_\_\_\_\_ (AB)

(c)  $5x + 7 = 22$

\_\_\_\_\_  
\_\_\_\_\_ (TAAB)

(d)  $5x - 8 = 2x + 10$

\_\_\_\_\_  
\_\_\_\_\_ (TAAB)

### QUESTION NINE

Factorise the following

(a)  $6y - 24 =$  \_\_\_\_\_ (AT)

(b)  $4x^3 - 30x =$  \_\_\_\_\_ (AB)

(c)  $8x^6y^2 - 36x^2y^5 =$  \_\_\_\_\_ (AB)

**QUESTION TEN**

Martha went to a shop and bought a dress. When leaving, she found a jacket for \$80 that she also bought. The price of the jacket was \$10 less than three times the price of the dress. What was the price of the dress? Write an equation using the information above. Then use the equation to find the price of the dress. **(TAAB)**

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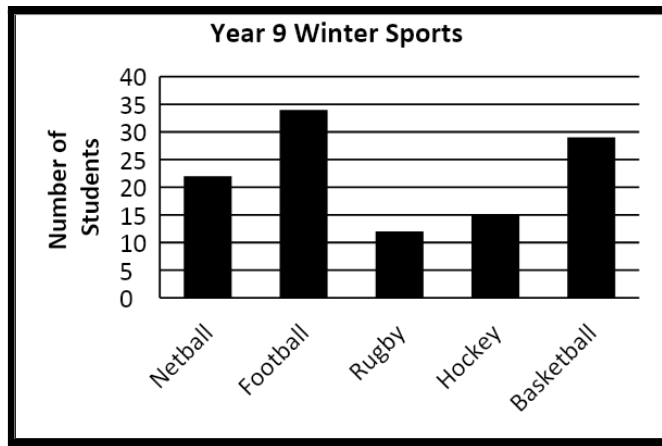
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**Section C: Statistics**

**QUESTION ONE**



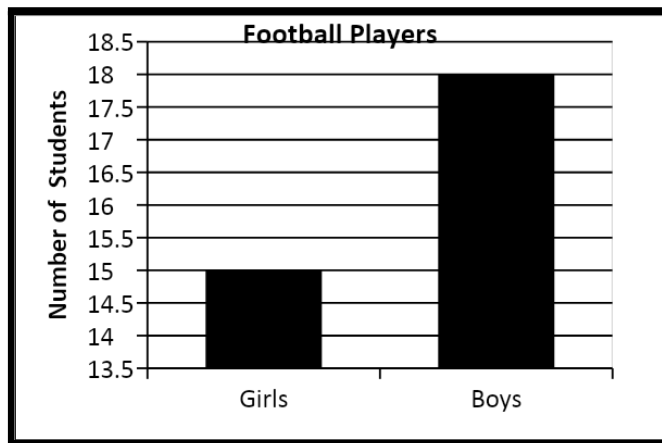
(a) Write the sports in order from most popular to least popular.

(AT)

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The head Football Coach made the following incorrect statement.

“The graph shows that the number of boys playing football is more than double the number of girls playing football.”

Explain how the graph could have caused the coach to make an incorrect statement.

(AB)

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## QUESTION TWO

The Basketball Coach recorded the number of points the team scored in their games this season.

87, 98, 76, 74, 78, 101, 98, 88, 24, 68

(a) Calculate the range of the number of cream buns sold.

\_\_\_\_\_ (AT)

(b) Calculate the mean number of points scored. ( Show your working) (AB)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(c) Calculate the median number of points scored. (AT)

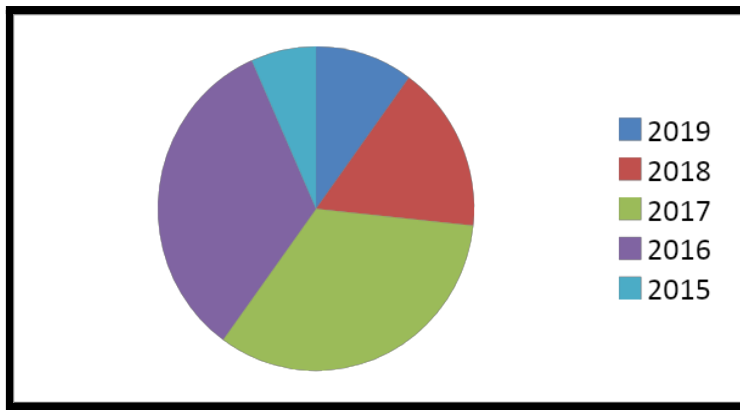
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(d) Is the mean or the median the best measure to use when discussing the number of points scored for the season? Given a reason for your answer. (TAAB)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### QUESTION THREE

The pie graph shows the number of year 9 students playing rugby over the past five years.



(a) What two years had the same number of students playing rugby? (AT)

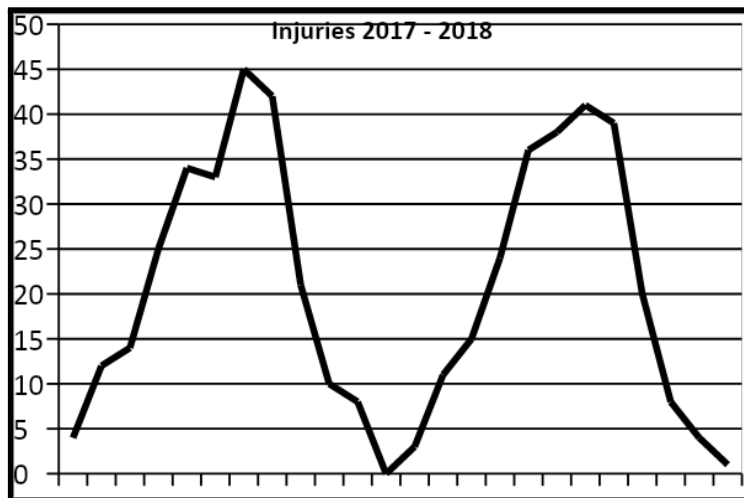
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(b) 78 year 9 students played rugby from 2015 - 2019. How many students played rugby in 2018? (AB)

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**QUESTION FOUR**

The graph shows the number of students with sports injuries at school during 2017 and 2018.



Describe what the graph shows about the number of sports injuries in 2017 and 2018 (TAAB)

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**QUESTION FIVE**

The school has two year 9 Netball teams. The Diamonds and Sapphires. The number of goals scored each game in 2018 listed below.



Diamonds

12, 22, 14, 16, 14, 23, 26, 18, 16, 29, 30, 22, 8, 21

Sapphires

8, 13, 9, 23, 13, 12, 7, 9, 10, 11, 14, 15

(a) Complete the table below

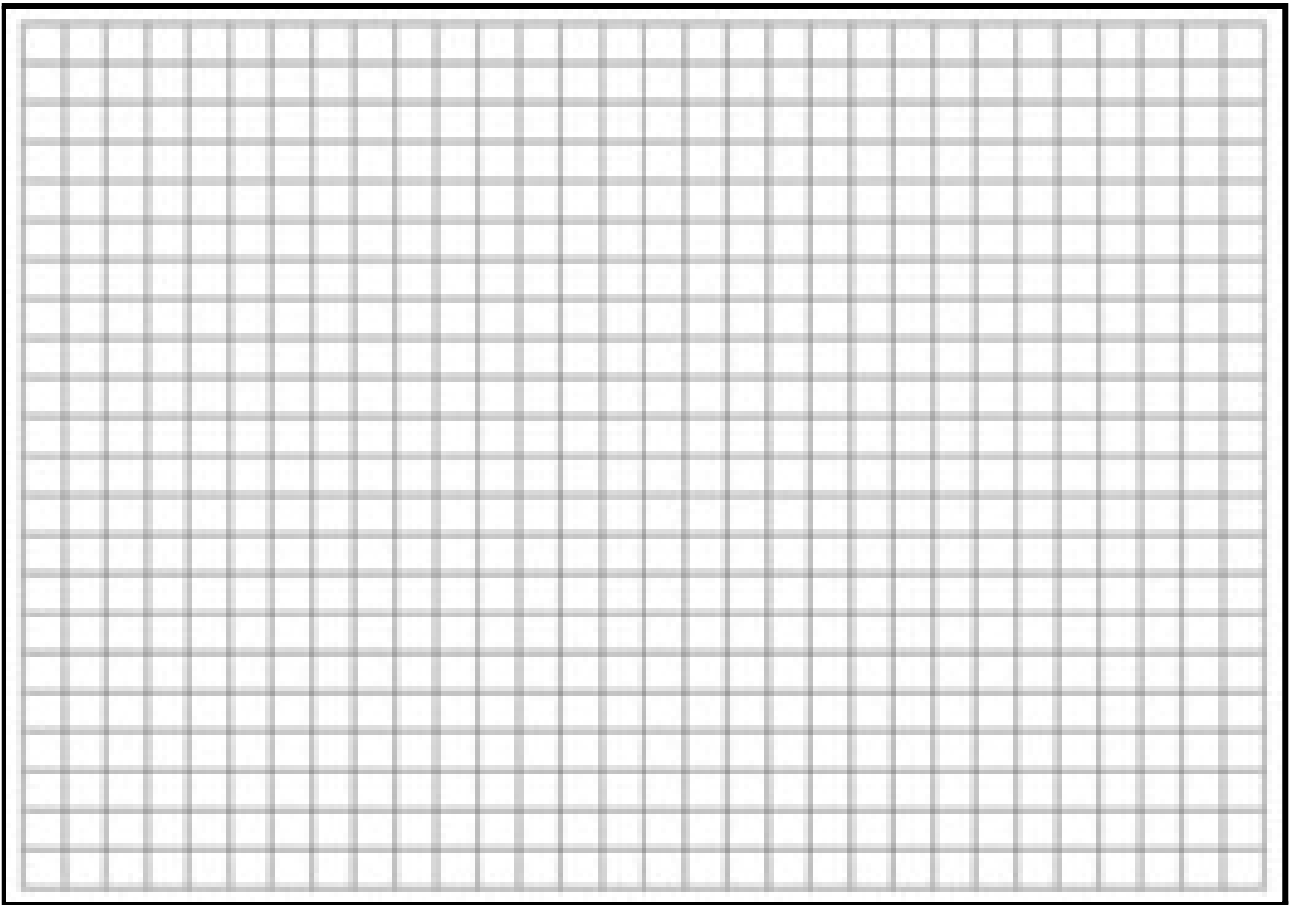
(TAAB)

Working space to calculate

	Diamonds	Sapphires
Lowest Value		
Lower Quartile		
Median		
Upper Quartile		
Highest Value		

(b) Draw a double box and whisker plot to show the number of goals scored for each team.

(TAAB)



(c) Using features of the box and whisker plot, discuss the similarities and differences in the number of goals the Diamonds and sapphires Scored. ( TAAB)

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(d) Does this graph show that one team wins more games than the other? Give a reason for your answer. (TAAB)

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