

Core Maths –Stats Project Bridging Unit.

Task: To produce a report on the following data:

The average resting heart beat for an adult in the United Kingdom is 72 beats per minute and the standard deviation is 11 beats. Resting heartbeat is the number of beats in one minute when a person is at rest.

Eight sports stars from a group of rugby, netball and dart players were asked to measure their own resting heart beats and the results are given below:

| Rugby | Netball | Darts |
|-------|---------|-------|
| 88 | 80 | 98 |
| 45 | 62 | 102 |
| 49 | 72 | 72 |
| 65 | 71 | 74 |
| 62 | 79 | 69 |
| 63 | 65 | 85 |
| 59 | 62 | 84 |
| 75 | 85 | 89 |

You have been asked to produce a statistical report on this data set and form your own conclusions. You need to consider the following questions:

Task 1: Averages

Calculate the mean, mode, median and range of all three sets of data. (4 marks)

Draw a box plot for each group – how do the box plot compare? (8 marks)

How do each team compare to the national average? Which of the averages are useful and which ones are not useful? (8 marks)

Task 2: Research- Standard Deviation

What is the definition of the standard deviation of a data set? Can you find any formulae linked to standard deviation? (5 marks)

Calculate the standard deviation for each of the sports teams and comment on what this is telling you about each data set. (10 marks)

Task 3: Sampling

The research above has been collected using a random sampling technique. Research three other sampling methods that could be used and comment on the usefulness of each method. **Hint: You may wish to consider quota, stratified, cluster and systematic methods of sampling.** (15 marks)

The sample size for the data sets is eight. Is this a big enough sample? What would you recommend the sample size to be? What are the dangers of a small sample? (5 marks)

Task 4: Percentages Questions.

- a) All three groups go on an intensive fitness course over the summer holidays, this reduces mean of their resting heart beats by 10% for each group. Calculate the new resting heart beats of each group and round the answer to one decimal place. **(5 marks)**
- b) Jimmy was one of the rugby players in the sample. His original resting heart beat was 88, this reduced to 80 after a month's intensive fitness regime. What is the percentage decrease of his resting heartbeat over this period? **(5 marks)**
- c) Lisa is a netball player with resting heartbeat of 80. She also goes on a fitness programme for three months. Each month her resting heartbeat decreases by 7%. What is her resting heartbeat after the three month period? Round your answer to one decimal place. **(5 marks)**
- d) Ben and Anne are in competition to decrease their resting heartbeat the most.

| Name | Ben | Anne |
|--------------------|-----|------|
| Original Heartbeat | 95 | 72 |
| Final Heartbeat | 89 | 67 |

Ben says he has won as his heartbeat has decreased by the biggest amount. Anne disagrees and says Ben hasn't taking into account percentage decrease. Who do you think is correct? **(5 marks)**

Task 5: Research Project.

- a) Collect the resting heartbeat of ten people, present this in a table and suitable graph **(5 marks)**
- b) Calculate the mean, mode, median, range and standard deviation of your data set **(8 marks)**
- c) Write a concluding paragraph explaining how your data set compares to each of the teams **(5 marks)**

Task 6: Fermi Estimation

Estimate the number of times your heart will beat in your lifetime. Write down any assumptions you have made, write down a justification for these and show each stage of your calculation very clearly. Evaluate your answer- how could you make the answer more accurate? **(7 marks)**

Note: There will also be marks given for the quality and cohesion of your written answers and presentations. Take your time with each section- this project should take you 4-5 hours to complete to a good standard.

If you are stuck, feel free to email us pmatuszewskyj@tuxford-ac.org.uk htaylor@tuxford-ac.org.uk for some advice.