



AUSTRALIAN ISLAMIC COLLEGE

Australian National Curriculum Mathematics Holiday Homework

Yr 10 PW2 (Investigation 4, Take home component, Term 4, 2017)

Cluster: Statistics

Name: _____ ID: _____

Teacher: _____

Instructions:

- Answer ALL questions (Part 1, 2 and 3)
- Calculator is allowed
- Make sure answers are supported with working and explanation where required
- Duration of this holiday homework is 2 weeks.
- There will be a Validation Test during Week 2 of Term 4 based on this investigation.

Mark: _____/60

Percentage: _____%

HIGH	MEDIUM	LOW
Outcome Demonstrated	Satisfactory	Below Benchmark
Student demonstrated appropriate mathematical behaviour on $\geq 50\%$ of complex tasks	Student demonstrated appropriate mathematical behaviour on $\geq 50\%$ of simple tasks	Student demonstrated appropriate mathematical behaviour on $\leq 50\%$ of simple tasks

PART 1 – Data Representation: Histograms (16 Marks)

Indigenous population comparison

The following data was collected by the Australian Bureau of Statistics during the 2011 National Census. It shows the population of Indigenous and non-Indigenous people in Australia and uses class intervals of 5 years.



Age	Total	Indigenous	Non-Indigenous	Indigenous status not stated
Total all ages	21 507 719	548 371	19 900 765	1 058 583
0–4 years	1 421 048	67 416	1 282 738	70 894
5–9 years	1 351 921	64 935	1 222 111	64 875
10–14 years	1 371 055	64 734	1 241 794	64 527
15–19 years	1 405 798	59 200	1 282 018	64 580
20–24 years	1 460 675	46 455	1 333 622	80 598
25–29 years	1 513 237	38 803	1 387 922	86 512
30–34 years	1 453 777	33 003	1 345 763	75 011
35–39 years	1 520 138	34 072	1 414 171	71 895
40–44 years	1 542 879	33 606	1 438 346	70 927
45–49 years	1 504 142	28 818	1 407 494	67 830
50–54 years	1 447 403	24 326	1 357 677	65 400
55–59 years	1 297 247	18 640	1 220 529	58 078
60–64 years	1 206 117	13 592	1 138 395	54 130
65 years and over	3 012 282	20 771	2 828 185	163 326

Indigenous Histogram

- Use the given data to construct a histogram for the population of Indigenous people in Australia in 2011 (if you are unsure what a histogram looks like, google image search it). **(5 Marks)**

- b. Which age group contained the most Indigenous people? **(1 Mark)**

- c. Describe the shape of the histogram. Is it symmetrical or skewed and why?
(2 Marks)

Non-Indigenous histogram

- a. Use the given data to construct a histogram for the population of non-Indigenous people in Australia in 2011. **(5 Marks)**

- b. Which age group contains the most number of non-Indigenous people? **(1 Mark)**

- c. Describe the shape of the histogram. Is it symmetrical or skewed and why?
(2 Marks)

PART 2 – Statistics (32 Marks)

You are given a data set of how many 'Crescent Moons' were collected by 13 gamers who played the game 'Super AIC Bros 2'. Here are their scores below:

1, 1, 2, 3, 4, 5, 5, 6, 7, 7, 7, 9, 10

You will be using this data set to find different statistical data. This includes measures of central tendency (mean, median, mode), the range and the spread (standard deviation) of data.

You are given the formula/definition for each:

Mean: Average of data, so Sum (adding) of all data divided by how much data you have.

Median: The middle value

Mode: The value you have the most of.

Range: The difference (subtracting) of your highest number and lowest number.

Standard Deviation:

To calculate the **sample standard deviation**, follow these steps.

- 1 Find the mean (\bar{x}).
- 2 Find the difference between each value and the mean (called the deviation).
- 3 Square each deviation.
- 4 Sum the squares of each deviation.
- 5 Divide by the number of data values less 1 (i.e. $n - 1$).
- 6 Take the square root.

$$\sigma = \sqrt{\frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + \dots + (x_n - \bar{x})^2}{(n - 1)}}$$

- a) Determine all the measures of central tendency (mean, median, mode), spread and the range for the set of data.

Mean **(2 Marks)**

Median = _____ **(1 Mark)**

Mode = _____ **(1 Mark)**

Range = _____ **(1 Mark)**

Standard Deviation **(3 Marks)**

Qn 1. (1, 8, 5, 2 = 16 marks)

a) Add 4 to each of the scores in the original data set and write down the new list of scores.

b) Calculate the measures of central tendency, spread and the range for this set of data.

i. Mean (2 Marks)

ii. Median: _____ (1 Mark)

iii. Mode: _____ (1 Mark)

iv. Range: _____ (1 Mark)

v. Standard Deviation (3 Marks)

c) Compare these results with those calculated in Qn 1 part b). Describe what has happened to the following **below (if it remains the same, increased/decreased and if so by how much? Did it increase/decrease by a factor/multiple of something?)**:

Mean :

Mode :

Median:

Range:

Standard Deviation =

- d) Looking at Q1 part c), knowing that some of the measures changed from the original when you added 4, what do you think would happen if you subtracted 4 from the original data instead and which measures would change?

Qn 2. (1, 8, 5, 2 = 16 marks)

- a) Multiply each of the scores listed in the original data set by 3 and write down the new list of scores.
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- b) Calculate the measures of central tendency and the range for this set of data.

i. Mean (2 Marks)

ii. Median: _____ (1 Mark)

iii. Mode: _____ (1 Mark)

iv. Range: _____ (1 Mark)

v. Standard Deviation (3 Marks)

- c) Compare these results with those calculated in Qn 2 part b). Describe what has happened to the measures and the range.

Mean :

Mode :

Median:

Range:

Standard Deviation =

- d) Looking at Q2 part c), knowing that some of the measures changed from the original when you multiplied by 3, what do you think would happen if you divided the original data by 3 instead and which measures would change?

PART 3 – Islam and Gambling (12 Marks)

In Islam, gambling is haram. In the Quran it states:

"O you who believe! Intoxicants (all kinds of alcoholic drinks), gambling, al-Ansaab [sacrifices for idols, etc.] and al-Azlaam [arrows for seeking luck or decision] are an abomination of Shaytaan's handiwork. So avoid (strictly all) that (abomination) in order that you may be successful. Shaytaan wants only to excite enmity and hatred between you with intoxicants (alcoholic drink) and gambling, and hinder you from the remembrance of Allaah and from al-salaat (the prayer). So, will you not then abstain?"[al-Maa'idah 5:90-91]

Anything Allah(SWT) forbids is to protect us from falling into practices that lead us into negative traits and destroy us, and gambling (playing games of chance for real money or items) is no exception. To add, anything forbidden usually has negative effects on a person or society. For Part 3 you will be answering a few questions on the negatives of gambling within society.

Q1. Describe what is a gambling addiction and a few common signs/side effects (4 marks).

Q2. List the negative effects of gambling, specifically social effects and economic effects (6 marks).

Q3. How can gambling be treated? (2 marks)

Below are some poker probabilities, this is just for interest and to see that gambling holds a huge risk when playing common Casino based games ☺.

The Probability That...	%	Odds
Non-pairs will pair at least one card	32.00%	2-to-1
Two suited cards will make a flush	6.50%	15-to-1
Two suited cards will flop a flush	0.85%	118-to-1
Two suited cards flop a four flush	10.90%	9-to-1
A pair will flop a set	12.00%	8-to-1
A pair will flop four of a kind	0.25%	400-to-1