Revision Sheet 5 – Stats (Chaps 1 and 4) **Review: Wed 23/1/19**

Q1. Write a survey question that will generate (i) nominal categorical data and (ii) continuous numerical data.

Q2. Describe two precautions that should be taken when taking a sample from a population.

Q3. Explain the difference between stratified sampling and cluster sampling. Explain, also, why you might choose the method over a simple random sample.

Q4. (a) Give two tips you would advise when designing a questionnaire.
(b) Give one advantage and one disadvantage of online surveys.

Q5. Vincent had a collection of old pennies. The old following table shows how old each coin was and how much it weighed.

Age(x)	51	47	53	33	39	46	42	48	28	36
Weight(y)	7.3	9.5	6	11.1	10.4	8.5	9.7	7.4	11.5	11.6

(i) Find the mean age of the coins.
(ii) Find the mean weight of the coins.
(iii) Draw a scatter graph to represent the data.
(iv) Comment on the type of correlation (if any).
(v) Plot the mean age and mean weight point (x, y) and label it K.
(vi) Draw a line of best of best fit through the mean age and mean weight point, K.
(vii) Use this line of best fit to estimate the following:
a) The expected weight of a 75-year old coin.
b) The expected age of a coin with a weight of 13.7g
(viii) Are your answers to (a) and (b) reliable? Justify your answers.
(ix) Use your calculator to calculate the correlation coefficient r, and see how it compares to your answer from part (iv).

Q6. The claims made against an insurance company for a certain year are shown below.

Amount(€1000s)	0-20	20-40	40-60	60-80	80-100
No. of Claims	24	16	42	40	12

(i) In which interval does the median lie?
(ii) By using the mid-interval values in each range, find an estimate for the total amount paid out by the company in the year.

Q7. The students in a class are divided into two groups, A and B, each with twelve students. All the students are given a spelling test consisting of 50 words. The number of right answers given by each student in each group is listed below:

A	31	17	42	23	27	15	27	38	25	20	28	33
B	18	35	26	22	14	44	33	19	20	47	21	39

(i) Represent this data on a back-to-back stemplot. Which group do you think performed better?
(ii) Which group has the greater range?
(iii) Calculate the median for each group. How do the groups compare?
(iv) Calculate the mean for each group. Comment on the difference between the median and the mean for each group.
(v) Calculate the interquartile range for each group. What do you think tells us about the distribution of scores in each group?
(vi) Calculate the standard deviation for each group. How do the standard deviation and the interquartile range compare for each group?

Q8. 20 students in a class set sat a Maths exam and their ranked scores were: 14, 18, 27, 35, 43, 48, 57, 58, 60, 63, 63, 65, 67, 71, 73, 76, 79, 81, 84, 92.
(i) Sarah obtained 71 in this test. What is her percentile ranking?
(ii) What is the 35^{th} percentile i.e. P_{35}?
(iii) What is the P_{78}?

Q9. Calculate the mean and the standard deviation of the data below: (i) by hand and (ii) using a calculator

Length (cm)	0-10	10-20	20-30	30-40	40-50
Number	4	16	20	12	6

Q10. 1000 students take a new design of aptitude test. Their scores are normally distributed with a mean of 65 and a standard deviation of 7. Use the empirical rule to estimate:
(i) the percentage of students who scored between 58 and 79 on the test
(ii) the number of students who scored between 65 and 72 on the test

Answers:

Q5. (i) 42.3 (ii) 9.3 (vii)(a) 5g (b) 26yrs (ix) -0.9252

Q6. (i) 40 – 60 (ii) €6,700,000

Q7. (ii) B has range 33 and A has range 25 => B (iii) Median A = 27, Median B = 24
(iv) Mean of A = 27.2, Mean of B = 28.2, A is reasonably symmetric and hence the mean and median are close, B is skewed to the right and hence the mean is larger than the median
(v) IQR of A = 10.5, IQR of B = 17.5, Data in B is more widely spread about its centre than A
(vi) Std Dev A = 7.7, Std Dev of B = 10.6, similar to the IQR the Std Dev of B is greater than the Std Dev of A. Both Std Devs are smaller than the corresponding IQRs

Q8. (i) 65^{th} (ii) 57.5 (iii) 77.5

Q9. (i) 25cm (ii) 10.83cm

Q10. (i) 81.5% (ii) 340