Name: _____ Date: _____
IB Math Studies / SL Ms. Guarnaccia / Dr. Huson

Statistics Review Problem Set 4

1a. *[3 marks]*

The Brahma chicken produces eggs with weights in grams that are normally distributed about a mean of 55 g with a standard deviation of 7 g. The eggs are classified as small, medium, large or extra large according to their weight, as shown in the table below.

Size	Weight (g)
Small	Weight < 53
Medium	$53 \leq$ Weight < 63
Large	$63 \leq$ Weight < 73
Extra Large	Weight ≥ 73

Sketch a diagram of the distribution of the weight of Brahma chicken eggs. On your diagram, show clearly the boundaries for the classification of the eggs.

1b. *[4 marks]*

An egg is chosen at random. Find the probability that the egg is

(i) medium

(ii) extra large.

1c. *[2 marks]*

There is a probability of 0.3 that a randomly chosen egg weighs more than w grams.

Find w.

1d. *[2 marks]*

The probability that a Brahma chicken produces a large size egg is 0.121. Frank's Brahma chickens produce 2000 eggs each month.

Calculate an estimate of the number of large size eggs produced by Frank's chickens each month.

1e. *[3 marks]*

The selling price, in US dollars (USD), of each size is shown in the table below.

Size	Selling price (USD)
Small	0.30
Medium	0.50
Large	0.65
Extra Large	0.80

The probability that a Brahma chicken produces a small size egg is 0.388.

Estimate the monthly income, in USD, earned by selling the 2000 eggs. Give your answer correct to two decimal places.

2a. *[2 marks]*

A group of candidates sat a Chemistry examination and a Physics examination. The candidates' marks in the Chemistry examination are normally distributed with a mean of 60 and a standard deviation of 12. Draw a diagram that shows this information.

2b. *[1 mark]*

Write down the probability that a randomly chosen candidate who sat the Chemistry examination scored at most 60 marks.

2c. *[2 marks]*

Hee Jin scored 80 marks in the Chemistry examination. Find the probability that a randomly chosen candidate who sat the Chemistry examination scored **more** than Hee Jin.

2d. *[2 marks]*

The candidates' marks in the Physics examination are normally distributed with a mean of 63 and a standard deviation of 10. Hee Jin also scored 80 marks in the Physics examination. Find the probability that a randomly chosen candidate who sat the Physics examination scored **less** than Hee Jin.

2e. *[2 marks]*

Determine whether Hee Jin's Physics mark, **compared to the other candidates**, is better than her mark in Chemistry. Give a reason for your answer.

2f. *[3 marks]*

To obtain a "grade A" a candidate must be in the top 10% of the candidates who sat the Physics examination.

Find the minimum possible mark to obtain a "grade A". Give your answer correct to the nearest integer.

3a. *[2 marks]*

The daily January temperature of Cairns is normally distributed with a mean of 34°C and a standard deviation of 3.

Calculate the probability that the temperature on a randomly chosen day in January is less than 39°C.

3b. *[2 marks]*

Calculate the expected number of days in January that the temperature will be more than 39°C.

3c. *[2 marks]*

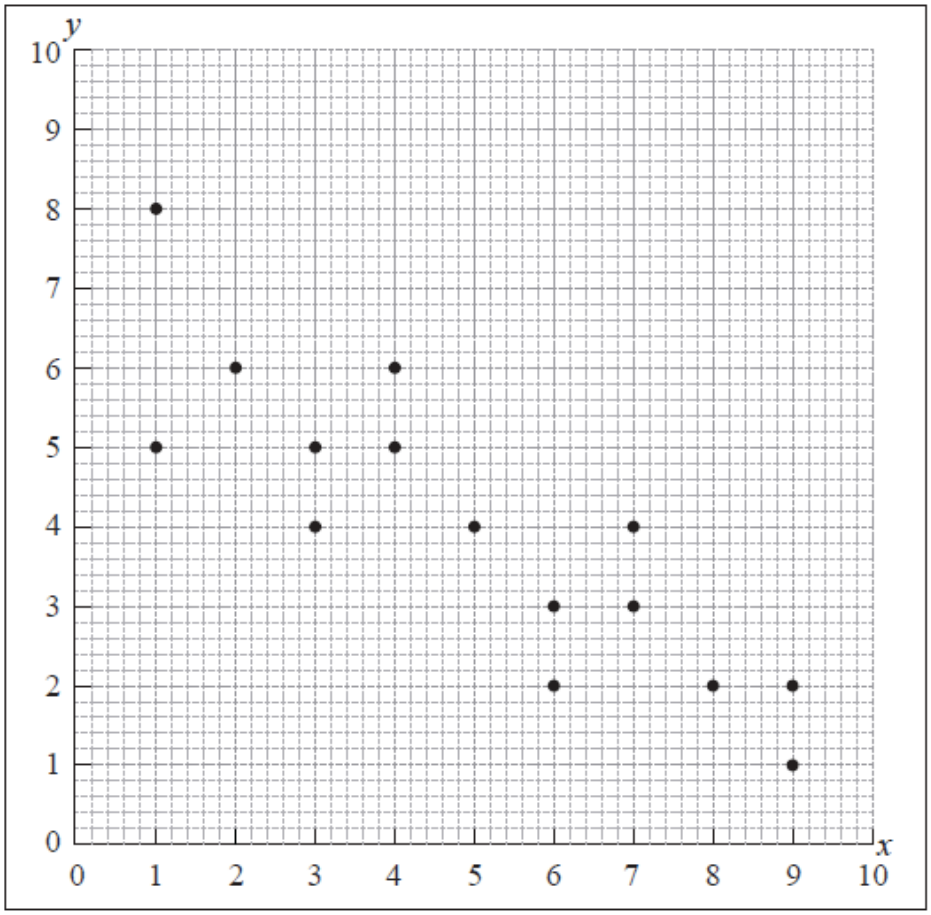
On a randomly chosen day in January, the probability that the temperature is above T °C is 0.7.

Find the value of T.

4a. *[2 marks]*

Consider the following values of x and y and the scatter diagram which represents the information given in the table.

x	1	1	2	3	3	4	4	b	6	6	7	7	8	9	9
y	5	a	6	4	5	5	6	4	2	3	3	4	2	1	2



Write down the value of

(i) a;

(ii) b.

4b. *[2 marks]*

State the type of correlation and the strength of the relationship.

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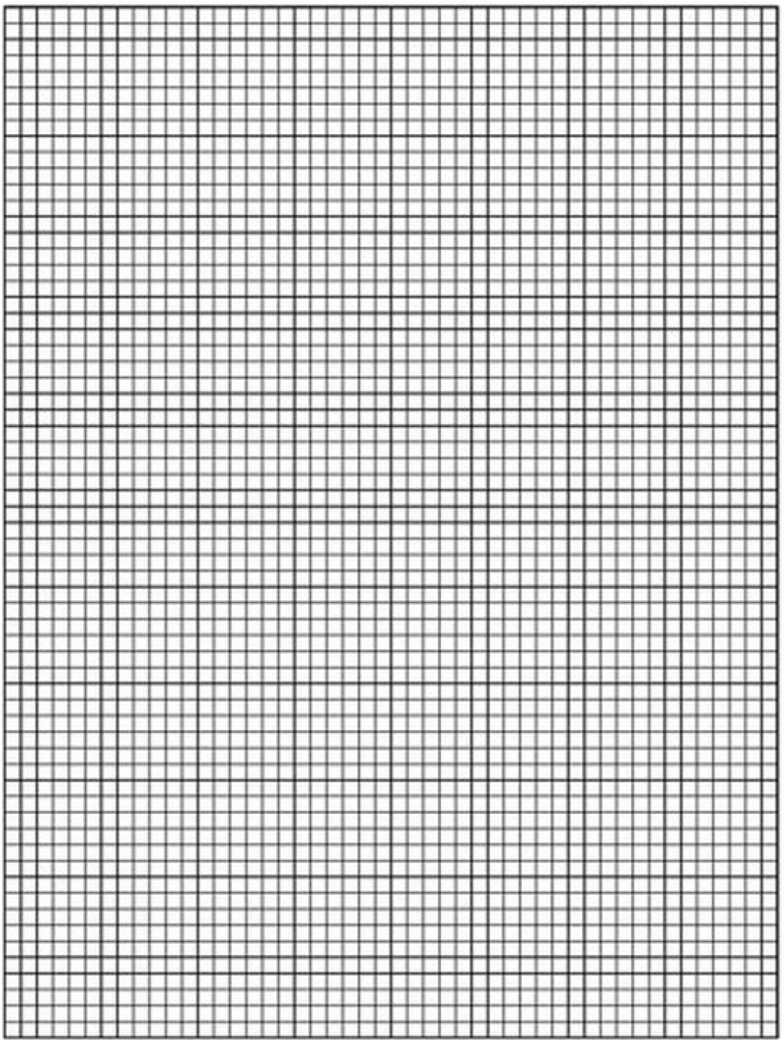
5a. Francesca is a chef in a restaurant. She cooks eight chickens and records their masses and cooking times. The mass m of each chicken, in kg, and its cooking time t, in minutes, are shown in the following table. *[4 marks]*

Mass m (kg)	Cooking time t (minutes)
1.5	62
1.6	75
1.8	82
1.9	83
2.0	86
2.1	87
2.1	91
2.3	98

Draw a scatter diagram to show the relationship between the mass of a chicken and its cooking time. Use 2 cm to represent 0.5 kg on the horizontal axis and 1 cm to represent 10 minutes on the vertical axis.



5b. *[2 marks]*

Write down for this set of data

(i) the mean mass, m;

(ii) the mean cooking time, t.

5c. *[1 marks]*

Label the point M(m,t) on the scatter diagram.