



## **S6 MATHEMATICS – 3 PERIODS PART A**

**DATE:** 10<sup>th</sup>, June 2019

**DURATION OF THE EXAMINATION:** 45 minutes

**Total: 35 points**

**Non Calculator**



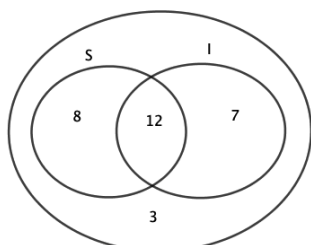
**NUMBER OF PUPILS: 10**

**EXERCISE 1-A:**

**[5+6]**

A group of 30 students went on a camping trip.

- a. Of these, 12 returned with both sunburns and insect bites and 20 reported sunburn. How many suffered only insect bites if it is known that three students suffered neither? Draw a **Venn-Diagram** to illustrate the situation.



From the Venn-Diagram we can see that 7 students suffered insect bites only.

$$n(I - S) = 7$$

- b. In the group, 9 students had food allergies. Of the 16 girls in the group 5 had food allergies. A student from the group is picked at random. What is the probability that they don't have food allergies given that they are a boy? Draw a **two-way table** to illustrate the situation.

	Boys (B)	Girls (G)	Total
Food Allergy (A)	4	5	9
No Food Allergy (A')	10	11	21
Total	14	16	30

$$P(A'|B) = \frac{10}{14} = \frac{5}{7}$$

**EXERCISE 2-A:**

**[4+2]**



A lock consists of three wheels with the digits 0 to 9.

- a. Knowing that each digit has only been used once, what is the maximum number of attempts that must be made before the lock will open?

Here the order is important. The number of attempts is given by the permutation of 3 in 10

$${}_{10}P_3 = \frac{10!}{(10-3)!} = 10 \times 9 \times 8 = 720$$

$$\text{Maximum number of attempts} = 720$$

- b. What is the probability that the lock will open on the first try?

$$P(\text{lock opens at first attempt}) = \frac{1}{720}$$

**EXERCISE 3-A:****[4+4]**

Consider the data set described by the following frequency table :

Scores	Frequency
10	1
20	3
30	4
50	6
70	1

- a. Calculate its Mode, Median, Range and Inter-Quartile range.

Mode = value with highest frequency

$$\text{Mode} = 50$$

There are 15 values in the data set. The median is the 8th value.

$$\text{Median} = 30$$

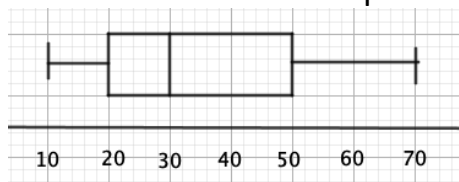
$$\text{Range} = 70 - 10 = 60$$

Q1 is the 4<sup>th</sup> value. Q1=20

Q3 is the 12<sup>th</sup> value. Q3=50

$$\text{IQR} = 50 - 20 = 30$$

- b. Draw a Box-Plot that represents this data set.

**EXERCISE 4-A:****[5+5]**

- a. A sequence has general formula  $u_n = 15 + 3(n - 1)$

- i. What type of sequence is it? (State  $u_1$  and  $r$  or  $d$ ).

It is an algebraic sequence.  $u_1 = 15$  and  $d = 3$

- ii. Calculate its 21st term.

$$u_{21} = 15 + 3(21 - 1) = 75$$

- b. A geometric sequence has the first term equal to 10 and the common ratio equal to  $-2$ .

- i. Write a recurrence formula to describe this sequence.

$$\begin{cases} u_1 = 10 \\ u_{n+1} = -2u_n \end{cases}$$

- ii. Calculate the terms  $u_2$ ,  $u_3$  and  $u_4$ .

$$u_2 = -2 \times u_1 = -20$$

$$u_3 = -2 \times u_2 = 40$$

$$u_4 = -2 \times u_3 = -80$$