école européenne de strasbourg	**Date**	**13/12/2021**
	Class	**S6EN**
	Subject	**MATHEMATICS** Part B
	Duration	**45 Minutes**
	Teacher	**D. Shaw**

Name:	**First Name:**	
Marks	***Comments***	***Signature***
/30		

Exam WITH Calculator

Instructions

- *This exam consists of 4 questions on 7 pages including this cover page.*
- *All questions are compulsory.*
- *Answer on squared paper (provided) and submit the question paper with your answers.*
- *Any attempt at cheating will result in the immediate cancellation of your exam.*
- *Read all the questions calmly and thoroughly and show all workings clearly.*

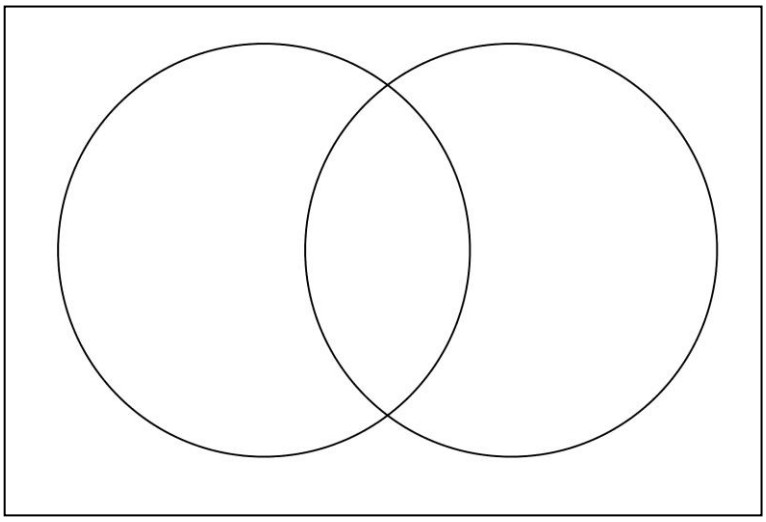
Good Luck!

Question 1: [6 Marks]

110 participants are taking part in a day-long conference. There are two different lectures being given on two different themes; politics and the economy. 62 sign up for the politics lecture. There are 51 participants who will go to the politics lecture and the economy lecture. 32 people will attend neither lecture.

a) Use the following sets to complete the following Venn diagram:

P: The participant is attending the politics lecture.
E: The participant is attending the economy lecture. /3



/3

a) A person is chosen at random from the crowd to do an interview. What is the probability that this person:

i) Will have attended the politics lecture or the economy lecture?

ii) Will have attended the economics lecture, but not the politics lecture

Question 2: **[4 Marks]**

Deduce an equation for the line which passes through the points $A(-5,3)$ and $B(2,1)$.	/4

Question 3: [10 Marks]

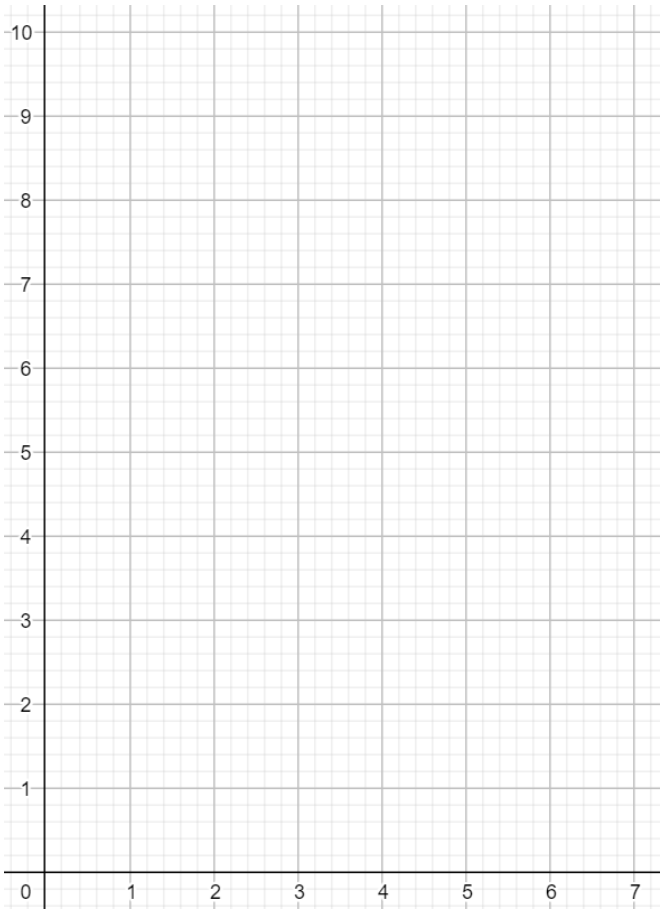
A population of bacteria in a petri dish has a growth model given by the function

$$f(x) = 3^{x-4}$$

Where x represents the number of days passed. And f(x) represents the number of thousands of bacteria present.

a) Using the grid below, draw a graph to represent the population of the bacteria over a week long period. Use the following table of values if you wish. /4

x	0	1	2	3	4	5	6	7
$f(x)$								



b) Calculate the number of bacteria in the dish at the beginning of the observation. /2

c) Use your graph to estimate the amount of bacteria present on day 6.	/2
d) Use your graph to estimate to the nearest day, how long it will take to pass 8000 bacteria.	/2

Question 4: [10 Marks]

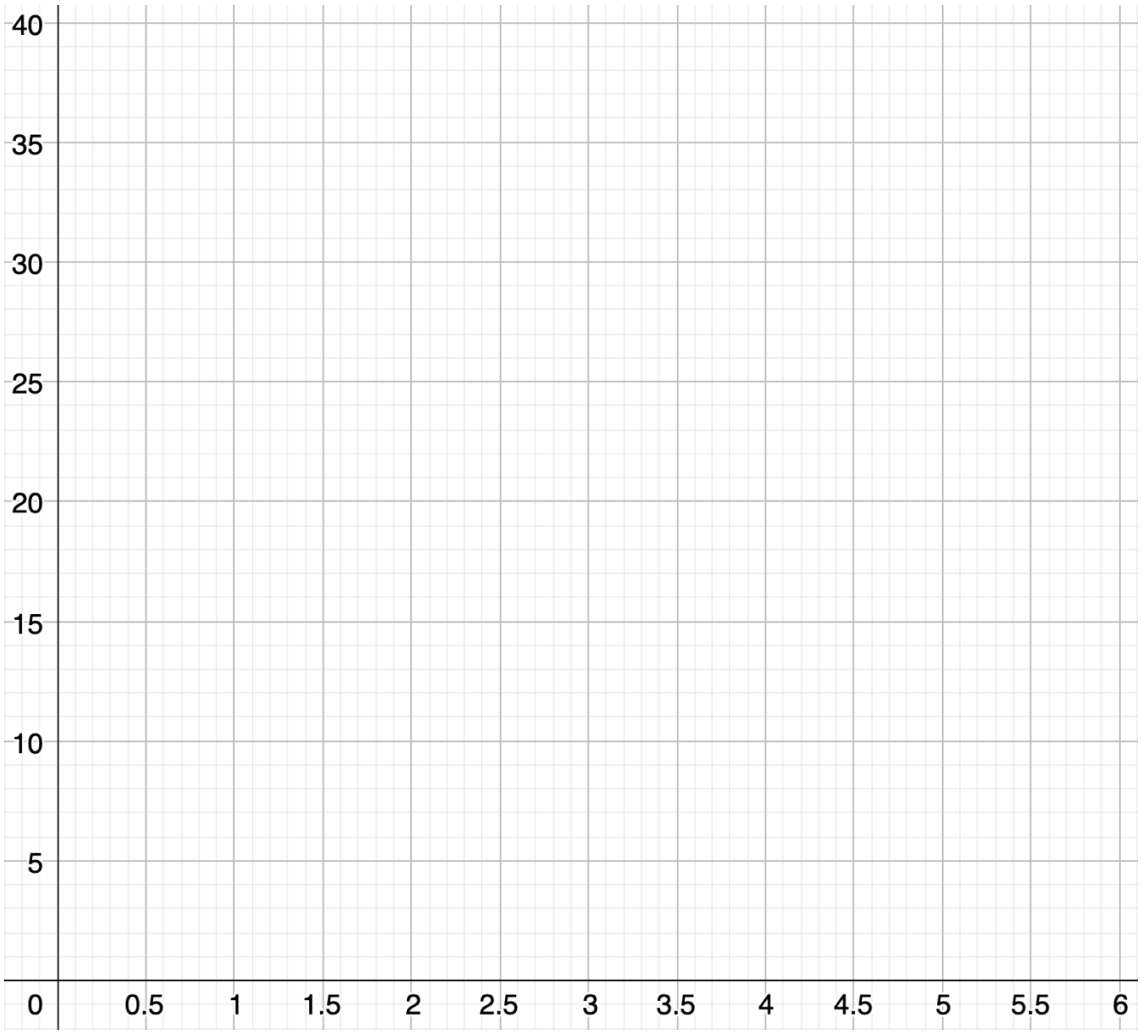
A water bomb is catapulted in the air. The height h, in metres, after t seconds is given by the function

$$h(t) = -4{,}9t^2 + 27t + 2.4$$

a) Complete the following table: /2

t	0	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	5,5
$h(t)$												

b) Draw the graph which represents the trajectory of the water bomb on the following cartesian plane: /2



c) What height is the water bomb after 1 second? /1

d) Estimate the maximum height achieved by the water bomb? Round to the nearest metre.	/1
e) How long does the water bomb stay above 30 metres high? You may answer with a calculation or a graphic interpretation. Round to nearest 0.1 seconds.	/2
f) Solve the equation $-4{,}9t^2 + 27t + 2.4 = 0$. After how much time will the water bomb explode on the ground? Round the answer to the nearest 0.1 second.	/2