Exercise 1



Exercise 2	Calc. : 🗡
Determine the equation of the line tangent to the function	5 marks
$f(x) = 3x^2 - 11x$	
at the point where the value of the instantaneous slope of the function is 1.	

Exercise 3	Calc. : 🗡
A small bag of lollipops is left in a classroom. Half of the lollipops are green, the rest are red.	
10 pupils enter the classroom, pick a lollipop from the bag at random, one after the other, and	
eat it.	
Is picking a green lollipop in this context a Bernouilli process? Justify your answer.	5 marks

Exercise 4	Calc. : 🗡
European Union regulations prohibit airlines from refusing to transport people with reduced	
mobility solely because of their disability. In Luxembourg, it is estimated that around 1% of	
people with reduced mobility use airline travel. It is assumed that the population flying out of	
Luxembourg is large enough that the probability of selecting a person with reduced mobility is	
constant.	
On an airline flight from Luxembourg to London, only two out of 150 seats were reserved for	
persons with reduced mobility.	
Justify the airline's decision to limit the number of seats reserved for persons with reduced	5 marks
mobility to two.	

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Exercise 5	Calc. : 🗡
The value of a certain luxury wine is growing rapidly. The price for a single bottle can be modelled	
by the function:	
$f(t) = 1 \ 400 \cdot e^{\ln(1.10) \cdot t}$	
where $f(t)$ is the price for a bottle in Euros and t is years after 2020.	
a) Interpret the two numbers 1 400 and 1.10.	3 marks
b) Calculate the price of a bottle in 2021.	2 marks

Exercise 6	Calc. : 🗡
Let f be the function defined by: $f(x) = \ln(x)$.	
a) Give the domain of f .	1 mark
b) Give the limit of f when x approaches $+\infty$.	1 mark
c) Determine any intervals over which f is increasing or decreasing.	1.5 marks
d) Give the inverse function of $f(x)$.	1.5 marks

Exercise 7

Let f(x) > g(x) be two positive functions, with respective primitives F(x) and G(x). It is further known, that:

x	1	4
F(x)	-3	8
G(x)	2	6

Determine the area bounded by the graphs of f(x) and g(x) and the lines of equations x = 1 and 5 marksx = 4.

Calc. : 🗡

<u>a</u> 1

1 mark

Exercise 8



Exercise 9									Calc. : 🗡
The table below gather	s the va	lues of	two va	ariables	x and	<i>y</i> :			
	x	0	2	4	6	8	10	7	
	У	6	7	10	14	15	20	-	
a) Draw a scatter diagram using these values.								3.5 marks	
b) Compute and add	d the m	iean po	oint to	your gr	aph.				1.5 marks
Exercise 10									Calc. : 🗡
State if the following s	entence	s are T	rue (T) or Fal	lse (F)	and \mathbf{ju}	stify y	your statements:	

a) The point A(e; 1) belongs to the function $y = \ln(x)$.

b) When a function is positive, its first derivative is necessarily increasing. 1 mark c) Let f be a function defined by $f(x) = e^x - 1$. Its first derivative is equal to zero for x = 0. 1 mark

d) Let
$$f$$
 be a function defined over \mathbb{R} such that $\int_0^3 f(x) \, dx > 0$ and $\int_3^6 f(x) \, dx < 0$. 1 mark

We can thus write : $\int_0^{\infty} f(x) dx = 0$

e) A set of bivariate data points (x; y) has a linear correlation coefficient of -0.95. We can thus 1 mark state that the correlation is weak.