Lab School Paris

Mock Brevet Exam

Mathematics

14 December 2023

Duration of the test: two hours

calculators: allowed

► The subject has four pages, in addition to this cover page.

► The subject is made up of eight independent exercises, labeled A to H. You can process them in any order that suits you.

► The test is graded out of one hundred points.

► ► ► Each answer must *<u>be preceeded by a justification</u>*.

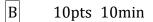
► ► The <u>English quality</u> and the <u>clarity of reasonning</u> will be decisive for the evaluation.

► Any trace of research will be taken into account in the evaluation.



7pts 10 min

Before the sales, a pair of pants and a shirt cost a total of $\in 135$. After reduction of 20% on the price of the pants and 30% on that of the shirt, the expense is $\in 103.50$. What was the price of the pants before the discount? **7pts**



Two people want to buy a property. The first has 4/7 of the price of this property and the second has 5/9 of this price.

1° Each has more than half the price of this property.
□ True □ Fals 2pts
Together, they have more than the price of this property.
□ True □ False 2pts

2° These people come together to buy this property; they then have €36,000 left. How much does this property cost? **6pts**

C North America, June 2019 15pts 10min

Succeed in your competition

In a Terminale class, eight students take an entrance exam into a higher education school. To be admitted, you must obtain a score greater than or equal to 10. A score is assigned with a precision of half a point (for example: 10; 10.5; 11...). We have the following information:

Information 1 Notes awarded to the 8 students in the class who took the competition: 10; 13; 15; 14.5; 6; 7.5; \blacklozenge ; \blacklozenge .

<u>Information 2</u> The series made up of eight notes: has a range of 9; has an average of 11.5; has a median of 12. 75% of the students in the class who took the competition passed.

l° Explain why it is impossible for one of the two notes designated by \blacklozenge or \blacklozenge to be 16. **3pts**

2° Is it possible that the two notes designated by \blacklozenge and \bigcirc are 12.5 and 13.5? **7pts**

D North America, June 2022 20pts 25min

Recommended daily physical practice

To be healthy, it is recommended to exercise regularly. A recommendation would be to do at least one hour of physical practice per day on average. On 1.6 million adolescents aged 11 & 17 surveyed, 81% of them do not respect this recommendation. According to a health press release

1° Of the 1.6 million adolescents aged 11 to 17 surveyed, how many do not respect this recommendation? **3pts**

After reading this press release, a teenager gives himself a goal.

Objective: "Do at least one hour of physical activity per day on average. » For 14 consecutive days, he notes in the following calendar the daily time he devotes to his physical practice:

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
50 min	15 min	1 hr	1 hr 40 min	30 min	1 hr 30 min	40 min
Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14
15 min	1 hr	1 hr 30 min	30 min	1 hr	1 hr	0 min

2°

a. What is the range of the 14 daily durations noted in the calendar? 2pts

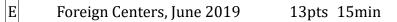
b. Give a median of these 14 daily durations. **5pts**

3°

a. Show that, over the first 14 days, this adolescent did not achieve his goal. 5pts

b. During the following 7 days, this teenager then decides to devote more time to sport to achieve his goal over the entire 21 days.

Over the last 7 days, what is the total duration of physical practice that he must at least plan to achieve his goal? **5pts**



Window shopping

In the window of a store A, a total of 45 models of shoes are presented. Some are designed for the city, others for sport and come in three different colors: black, white or brown.

1° Complete the following table. 3pts								
Model	For the city	For sport	Total					
Black		5	20					
White	7							
Brown		3						
Total	27		45					

2° We choose a model of shoes at random in this window.

a. What is the probability of choosing a black model? **2pts**

b. What is the probability of choosing a model for sports? **2pts**

c. What is the probability of choosing a model for the city in brown color? **2pts**

3° In the window of a store B, there are 54 models of shoes, 30 of which are black. We randomly choose a model of shoes in the window of store A, then in that of store B. In which of the two windows are we more likely to obtain a black model? **4pts**

11pts 10min

F

A digital code controls the opening of the door of a building. The opening code is composed of one number: 1; 2; 3; 4; 5 or 6 followed by a letter: A or B.

1° A visitor enters a code by randomly choosing a number, then a letter. What is the probability that the door will open? 5pts

2° Another visitor remembers that the number is a multiple of 3. He dials a code at random. How much does the probability that the door will open increase? 6pts

G 12pts 15 min

We have three bags, each containing 12 dark chocolates, 10 milk chocolates and 8 white chocolates. All the chocolates are indistinguishable to the touch and we take the chocolates at random.

1° In the first bag, we take a chocolate. What is the probability that he is black? **4pts**

2° In the second bag, after having obtained one chocolate of each type, we decide to take a fourth chocolate. 4pts

What is the probability that it is milk?

3° In the third bag, we take a chocolate and we see that it is white. We eat it, then we have a second chocolate.

What is the probability that the second one is white? 4pts

H 12pts 15 min

A television channel offers three games with €1,000 each.

1° In the first game, the candidate is presented with five envelopes. Only one allows them to win a trip worth \in 1,000 and the others are empty. What is the probability that the candidate will win the trip? 4pts

2° In the second game, the candidate is faced with six envelopes. One contains €500, two contains €200, one contains €100 and the others are empty. What is the probability that the candidate will win at least \in 200? 4pts

3° In the third game, the candidate is faced with eight envelopes. Three contain a €200 voucher, three contain a \in 100 voucher, two contain a \in 50 voucher. What is the probability that the candidate will win at most $\in 200$ in vouchers? 4pts