

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 *be preceded by a justification*.
- ▶ ▶ ▶ The *English quality* and the *clarity of reasoning* will be decisive for the evaluation.
- ▶ Any trace of research will be taken into account in the evaluation.

A 7pts 10 min

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

B 10pts 10min

Two people want to buy a property. The first has $\frac{4}{7}$ of the price of this property and the second has $\frac{5}{9}$ 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; ♦; ●.

Information 2

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.

1° Explain why it is impossible for one of the two notes designated by ♦ or ● to be 16. **3pts**

2° Is it possible that the two notes designated by ♦ and ● are 12.5 and 13.5? **7pts**

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

E

Foreign Centers, June 2019

13pts 15min

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.

- What is the probability of choosing a black model? **2pts**
- What is the probability of choosing a model for sports? **2pts**
- 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**

F 11pts 10min

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.

What is the probability that it is milk? **4pts**

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 €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 €200? **4pts**

3° In the third game, the candidate is faced with eight envelopes. Three contain a €200 voucher, three contain a €100 voucher, two contain a €50 voucher.

What is the probability that the candidate will win at most €200 in vouchers? **4pts**