

Admission test for the 1st year of the Bachelor's cycle

ZERO test

Numeracy, logic and reasoning

Duration: 1h30

⚠ No calculator allowed ❌

Part 1: Calculation

The Calculation subtest assesses mastery of simple knowledge in the areas of arithmetic, geometry and algebra. The questions are not listed in order of difficulty. The use of a calculator is not permitted.

1. The sum of 3 consecutive natural numbers is 165. What is the value of the largest of these 3 integers?

- A) 53 B) 54 C) 56 D) 58 E) 61

2. A swimming pool is strictly rectangular in shape. If we increase its length by 7 meters and decrease its width by 5 meters, its surface area remains unchanged. But if we increase its length by 20 meters and if we decrease its width by 13 meters, its surface area increases by 20m^2 . How wide is this pool?

- A) 105 meters B) 120 meters C) 135 meters D) 140 meters E) 155 meters

3. A theater offers two prices. For the first, the spectator pays the place 80F for each show. For the second, he pays a subscription of 100F and then pays his place 40F for each show. From how many show(s) does the subscription price become profitable for the spectator? (Fill in the answer in the box)

4. An entrance exam to a top business school involves taking a test and an oral interview. The test assessed out of 20, counts for a coefficient of 3 and the interview, also evaluated out of 20, for a coefficient of 2. The average score that a candidate must achieve to be admitted is 12 out of 20. One candidate scored 10.5 on the test. What is the minimum score she must obtain at her interview to be admitted?

- A) 12.75 B) 14.25 C) 12.5 D) 13.5 E) 14.75

5. x and y have the following properties: $x^2 + y^2 = 208$ and $xy = 58$. What is the value of $x + y$?

- A) 18 B) 29 C) 13 D) 37 E) 24

6. If m is equal to a quarter of $m - n$, what is the value of n/m ?

- A) -3 B) 2 C) -2 D) 3 E) -4

7. Kevin has 3 times as many pins as Jonathan. If he gave Jonathan 5 pins, he would only have twice as many pins as Jonathan. How many pins does Kevin have? (*Fill in the answer in the box*)

8. Robert goes on vacation with his savings. He plans to spend a quarter of his savings on the trip and two-fifths on his accommodation. He calculates that he will then have 32,200F left. How much is his savings?

- A) 92.000F B) 89.000F C) 78.000F D) 85.000F E) 95.000F

9. A real estate agent buys a share of land for 2,430,000F which he divides into lots of the same size. He then sells each lot for 180,000F. His profit is exactly equal to the purchase price of 6 lots. How many lots was the land divided into? (*Fill in the answer in the box*)

10. What is worth $\frac{4^4 - 2^3}{2^3}$?

- A) $2^5 - 1$ B) 2^3 C) 2 D) $2^{\frac{1}{2}}$ AND) $\frac{2}{3}$

11. In a nursery school, all the 25 children in the upper section (nursery two) are given a language test in a single day. In the morning, 10 pupils are tested and their average performance is equal to 8. In the afternoon, the remaining 15 pupils are tested and their average performance is equal to 11. What is the average performance for all of the 25 pupils?

- A) 9,8 B) 9,5 C) 9,9 D) 10,2 E) 9,2

12. In how many ways can an assembly of 12 people designate a board comprising a President, a Vice-President and a Secretary?

- A) 1302 B) 132 C) 11880 D) 445 E) 1320

13. A saver withdraws from his bank a sum of 78,475 F, the result of an investment at 7.5% annual interest, which he had made exactly one year before. How much money had this saver invested? (*Fill in the answer in the box*)

14. What is the numerical value of the expression $(ac + bd)^2 + (ad - bc)^2$ knowing that $a^2 + b^2 = 1$ and $c^2 + d^2 = 1$?

A) 2 B) 2,25 C) 1,732 D) 1,414 E) 1

15. Consider a triangle ABC , right-angled in A . Outside this triangle, we construct the semicircles C_1 of area S_1 , C_2 of area S_2 and C_3 of area S_3 , which respectively have the following diameters $[BC]$, $[CA]$ and $[AB]$. What is the expression for S_1 as a function of S_2 and of S_3 ?

A) $2S_2 - S_3$ B) $S_2 + 2S_3$ C) $S_2 + S_3$ D) $S_2 - S_3$ E) $S_2 - S_3/2$

16. A principal of 10,000 F is invested with an interest rate of 10% annually. In how many years will the accumulated interest exceed the principal?

A) 5 years B) 7 years C) 8 years D) 10 years E) 12 years

17. During a fair dedicated to fruit juices, a "kermesse" is organized. 7 lots are distributed, each consisting of a different quantity of orange juice. The first batch consists of half of the total amount of juice distributed plus half a liter of juice. The second one is made up of half of the rest plus half a liter, and so on until the seventh batch. What is the total quantity of this great beverage distributed in the seven batches?

A) 124 litres B) 125 litres C) 126 litres D) 127 litres E) 128 litres

18. 32 cylindrical concrete blocks are stacked on top of each other and form a column 81 meters high. There are two types of blocks: some 3 meters thick and others 2 meters thick. How many blocks are 2 meters thick? A) 15 B) 16 C) 17 D) 18 E) 19

19. A family gathers for a Christmas meal. To say hello, 66 hugs are exchanged. Knowing that all members have kissed all other members once, how many members does this family have?

A) 9 B) 10 C) 11 D) 12 E) 13

20. In the city of Douala, the police forces assigned to neighborhood surveillance include 3,500 police officers. Three police officers are assigned to each neighborhood considered to be at risk and two police officers to each neighborhood considered to be calm. There are twice as many so-called quiet neighborhoods as so-called at-risk neighborhoods. How many districts is Douala divided into?

A) 1.200 B) 1.450 C) 1.500 D) 1.525 E) 1.550

Part 2: Information Analysis

In all the following questions, you will always have the choice between one of these 5 propositions:

(A) Information (1) alone allows us to answer the question and information (2) does not.

This is the correct answer if: using only the information (1) we can correctly answer the question asked and using only the information (2) we cannot answer the question.

(B) Information (2) alone allows the question to be answered and information (1) does not.

This is the correct answer if: using only information (2) we can correctly answer the question asked and using only information (1) we cannot answer the question.

(C) Answering the question requires using information (1) and (2) TOGETHER.

This is the correct answer if: using information (1) & (2) we can correctly answer the question asked whereas used separately, the information does not allow us to answer the question asked.

(D) Each piece of information separately helps answer the question.

This is the correct answer if: using only information (1) we can correctly answer the question asked and using only information (2) we can also answer the question correctly.

(E) The two pieces of information together do not answer the question.

This is the correct answer if: The information given is insufficient to answer the question asked.

The use of the calculator is not permitted.

1. Is the integer p divisible by 5?

(1) $p/15$ is an integer

(2) $p/12$ is an integer

(A) Information (1) alone allows us to answer the question and information (2) does not.

(B) Information (2) alone allows the question to be answered and information (1) does not.

(C) Answering the question requires using information (1) and (2) TOGETHER.

(D) Each piece of information separately helps answer the question.

(E) The two pieces of information together do not answer the question.

2. What is the amount in Francs in Mr. Dupont's bank account?

(1) If we made a withdrawal of 5% from his account, there would be 21,375F left.

(2) If we made a payment of 500F, the amount in the account would become equal to 23,000F.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

3. Did André go to the cinema?

- (1) Victor never goes to the cinema without André or Pierre accompanying him.
- (2) Pierre and Victor went to the cinema.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

4. A 7-meter tube is cut into three pieces. How long is the longest piece?

- (1) A piece measures 3.70 m.
- (2) The difference in length between two pieces is 80 cm, and the third piece measures 40 cm.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

5. A and B are two strictly positive numbers. Is the product $A \cdot B$ strictly greater than 10?

- (1) $A > 5$
- (2) $B \leq 2$

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

6. Mr. Kokou owns a rectangular piece of land; following an inheritance, the length of the land was increased by 10 m, and the width was also increased by 10 m. What is the new area of the land?

- (1) The initial area of the land was 4000 m².
- (2) The initial perimeter of the land was 260 m.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

7. At the beginning of the year, Mr. Manga and Mr. Moka invest respectively, a sum X at a rate of 8%, and a sum Y at a rate of 8.5%. At the end of the year, their total gain is 4900 F. What is the value of X in francs?

- (1) Mr. Moka's gain is 1700 F.
- (2) $X = 2Y$

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

8. Which of John or Peter had the highest mark?

- (1) John scored better than Paul.
- (2) Paul scored lower than Peter.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

9. Kimbo went to the cinema. Did Bernard go to the cinema?

- (1) When Kimbo goes to the cinema, then Claude goes to the cinema.
- (2) When Claude does not go to the cinema, then Bernard does not go to the cinema.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

10. Knowing that x is a strictly positive number, what is the value of $\frac{\frac{1+y}{x+2}}{\frac{x+y}{x+2} - 1}$

- (1) $x = 3$
- (2) $y = 5$

- (A) Information (1) alone allows us to answer the question and information (2) does not.

- (B) Information (2) alone allows the question to be answered and information (1) does not.
(C) Answering the question requires using information (1) and (2) TOGETHER.
(D) Each piece of information separately helps answer the question.
(E) The two pieces of information together do not answer the question.

11. a , b and c are strictly positive numbers. Which is the largest of the three?

- (1) $b > a+c$
(2) $a > \frac{b+c}{2}$

- (A) Information (1) alone allows us to answer the question and information (2) does not.
(B) Information (2) alone allows the question to be answered and information (1) does not.
(C) Answering the question requires using information (1) and (2) TOGETHER.
(D) Each piece of information separately helps answer the question.
(E) The two pieces of information together do not answer the question.

12. From 1989 to 1990, college enrollment increased by 10%. In 1990, the number of girls enrolled was equal to the number of boys. What was the number of girls enrolled in 1990?

- (1) From 1989 to 1990, the number of boys enrolled increased by 5%.
(2) In 1989, there were a total of 1500 registered.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
(B) Information (2) alone allows the question to be answered and information (1) does not.
(C) Answering the question requires using information (1) and (2) TOGETHER.
(D) Each piece of information separately helps answer the question.
(E) The two pieces of information together do not answer the question.

13. a and b are two positive real numbers. Let $r = \frac{b}{a+b}$. What is the numerical value of r ?

- (1) b is worth 10% more than a
(2) $b = 11$ and $a + b = 21$

- (A) Information (1) alone allows us to answer the question and information (2) does not.
(B) Information (2) alone allows the question to be answered and information (1) does not.
(C) Answering the question requires using information (1) and (2) TOGETHER.
(D) Each piece of information separately helps answer the question.
(E) The two pieces of information together do not answer the question.

14. Two tiles A and B have densities d_A and d_B respectively. Which of the two is heavier?

- (1) $d_A = d_B + 0,04$.
(2) The two tiles have the same area.

- (A) Information (1) alone allows us to answer the question and information (2) does not.

- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

15. A wallet contains only 5 F coins and 2 F coins. How many 2 F coins does the wallet contain?

- (1) The content of the wallet amounts to 52 F.
- (2) The number of 5F coins is strictly greater than 8.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

16. Which of Peter or Paul had the highest fuel consumption in 1993?

- (1) In 1993, Peter's fuel consumption increased by 10% compared to 1992.
- (2) In 1993, Paul's fuel consumption decreased by 5% compared to 1992.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

17. Ten children buy marbles in a store:

- the first buys a marbles,
- the second buys b more marbles than the first,
- the third buys b more marbles than the second, and so on up to the tenth.

How many marbles did they buy in total?

- (1) $a = 5$
- (2) $b = 2$

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

18. Today is Peter's 10th birthday. Is Peter older than John?

- (1) Two years ago, John's age was twice that of Peter.
- (2) John's younger sister is older than Peter's elder sister.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

19. Is x is smaller than y ?

- (1) $x - y + 2 < 0$
- (2) $x - y - 2 < 0$

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered and information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps answer the question.
- (E) The two pieces of information together do not answer the question.

20. Two pipes A and B can be used to fill a tank. When using pipe A exclusively, the tank is filled in 20 minutes. How long will it take to fill the tank using pipes A and B together?

- (1) The section of pipe B is greater than that of pipe A.
- (2) The tank is filled in 15 minutes when using pipe B exclusively.

- (A) Information (1) alone allows us to answer the question and information (2) does not.
- (B) Information (2) alone allows the question to be answered but information (1) does not.
- (C) Answering the question requires using information (1) and (2) TOGETHER.
- (D) Each piece of information separately helps to answer the question.
- (E) The two pieces of information together do not answer the question.