+1/1/60+

EPFL

Teacher : **TEACHER**
EXAM - MA
DATE
DURATION

AC-345

Student 1

SCIPER : **999000** Room : **R-A** Signature :

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PROJET

- Place your student card on your table.
- **No other paper materials** are allowed to be used during the exam.
- Using a **calculator** or any electronic device is not permitted during the exam.
- For the **multiple choice** questions, we give :
  +3 points if your answer is correct,
  0 points if you give no answer or more than one,
  −1 points if your answer is incorrect.
- For the **true/false** questions, we give :
  +1 points if your answer is correct,
  0 points if you give no answer or more than one,
  −1 points if your answer is incorrect.
- Use a **black or dark blue ballpen** and clearly erase with **correction fluid** if necessary.
- If a question is wrong, the teacher may decide to nullify it.

Respectez les consignes suivantes | Observe this guidelines | Beachten Sie bitte die unten stehenden Richtlinien

choisir une réponse | select an answer
Antwort auswählen

ne PAS choisir une réponse | NOT select an answer
NICHT Antwort auswählen

Corriger une réponse | Correct an answer
Antwort korrigieren

ce qu'il ne faut **PAS** faire | what should **NOT** be done | was man **NICHT** tun sollte

Pour votre examen, imprimez de préférence les documents compilés à l'aide de auto-multiple-choice.

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Let the subset $E \subset \mathbb{R}$ defined by $E = \left\{ 2\left(1+\frac{1}{n}\right)^n : n \in \mathbb{N} \setminus \{0\} \right\}$.

Then

- ☐ the supremum of E belongs to E
- ☐ E is closed
- ☐ the minimum of E is 2
- ☐ 10 is a majorant of E

Question statement with several possible correct answers

- ☐ other correct answer choice
- ☐ wrong answer choice
- ☐ Correct answer choice
- ☐ False Answer Choice
- ☐ False Answer Choice

PROJET

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Let A be a bounded and non empty subset of $\mathbb{R}$.
Then $\inf A \in A$ and $\sup A \in A$.

☐ TRUE ☐ FALSE

Let $f\colon \mathbb{R} \to \mathbb{R}$ and $g\colon \mathbb{R} \to \mathbb{R}$ are two functions defined on all $\mathbb{R}$. If $f \circ g$ is injective, then g is injective.

☐ TRUE ☐ FALSE

PROJET

Third part, open questions

Answer in the empty space below. Your answer should be carefully justified, and all the steps of your argument should be discussed in details. Leave the check-boxes empty, they are used for the grading.

Question 4: *This question is worth 8 points.*

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8

We remind you that ...
Determine ...

PROJET

PROJET

Question 5: *This question is worth 2 points.*

☐0 ☐.5 ☐1 ☐.5 ☐2

We remind you that ...
Determine ...

PROJET

PROJET

+2/1/53+

EPFL

Teacher : **TEACHER**
EXAM - MT
DATE
DURATION

A-2

Student 2

SCIPER : **999001** Room : **R-A** Signature :

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PROJET

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- For the **true/false** questions, we give :
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  −1 points if your answer is incorrect.
- Use a **black or dark blue ballpen** and clearly erase with **correction fluid** if necessary.
- If a question is wrong, the teacher may decide to nullify it.

Respectez les consignes suivantes | Observe this guidelines | Beachten Sie bitte die unten stehenden Richtlinien

choisir une réponse | select an answer | Antwort auswählen

ne PAS choisir une réponse | NOT select an answer | NICHT Antwort auswählen

Corriger une réponse | Correct an answer | Antwort korrigieren

ce qu'il ne faut **PAS** faire | what should **NOT** be done | was man **NICHT** tun sollte

Pour votre examen, imprimez de préférence les documents compilés à l'aide de auto-multiple-choice.

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Question statement with several possible correct answers

- ☐ False Answer Choice
- ☐ wrong answer choice
- ☐ other correct answer choice
- ☐ Correct answer choice
- ☐ False Answer Choice

Let the subset $E \subset \mathbb{R}$ defined by $E = \left\{ 2\left(1+\frac{1}{n}\right)^n : n \in \mathbb{N} \setminus \{0\} \right\}$.

Then

- ☐ 10 is a majorant of E
- ☐ the supremum of E belongs to E
- ☐ the minimum of E is 2
- ☐ E is closed

PROJET

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Let $f\colon \mathbb{R} \to \mathbb{R}$ and $g\colon \mathbb{R} \to \mathbb{R}$ are two functions defined on all $\mathbb{R}$. If $f \circ g$ is injective, then g is injective.

☐ TRUE ☐ FALSE

Let A be a bounded and non empty subset of $\mathbb{R}$.
Then $\inf A \in A$ and $\sup A \in A$.

☐ TRUE ☐ FALSE

PROJET

Third part, open questions

Answer in the empty space below. Your answer should be carefully justified, and all the steps of your argument should be discussed in details. Leave the check-boxes empty, they are used for the grading.

Question 4: *This question is worth 8 points.*

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8

We remind you that ...
Determine ...

PROJET

PROJET

Question 5: *This question is worth 2 points.*

☐0 ☐.5 ☐1 ☐.5 ☐2

We remind you that ...
Determine ...

PROJET

PROJET

Pour votre examen, imprimez de préférence les documents compilés à l'aide de auto-multiple-choice.

+3/1/46+

EPFL

Teacher : **TEACHER**
EXAM - SV
DATE
DURATION

A-3

Student 3

SCIPER : **999002** Room : **R-A** Signature :

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PROJET

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- For the **true/false** questions, we give :
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choisir une réponse | select an answer
Antwort auswählen

ne PAS choisir une réponse | NOT select an answer
NICHT Antwort auswählen

Corriger une réponse | Correct an answer
Antwort korrigieren

ce qu'il ne faut **PAS** faire | what should **NOT** be done | was man **NICHT** tun sollte

Pour votre examen, imprimez de préférence les documents compilés à l'aide de auto-multiple-choice.

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Question statement with several possible correct answers

- ☐ False Answer Choice
- ☐ wrong answer choice
- ☐ False Answer Choice
- ☐ Correct answer choice
- ☐ other correct answer choice

Let the subset $E \subset \mathbb{R}$ defined by $E = \left\{ 2\left(1+\frac{1}{n}\right)^n : n \in \mathbb{N} \setminus \{0\} \right\}$.

Then

- ☐ the minimum of E is 2
- ☐ E is closed
- ☐ 10 is a majorant of E
- ☐ the supremum of E belongs to E

PROJET

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Let A be a bounded and non empty subset of $\mathbb{R}$.
Then $\inf A \in A$ and $\sup A \in A$.

☐ TRUE ☐ FALSE

Let $f\colon \mathbb{R} \to \mathbb{R}$ and $g\colon \mathbb{R} \to \mathbb{R}$ are two functions defined on all $\mathbb{R}$. If $f \circ g$ is injective, then g is injective.

☐ TRUE ☐ FALSE

PROJET

Third part, open questions

Answer in the empty space below. Your answer should be carefully justified, and all the steps of your argument should be discussed in details. Leave the check-boxes empty, they are used for the grading.

Question 4: *This question is worth 8 points.*

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8

We remind you that ...
Determine ...

PROJET

PROJET

Question 5: *This question is worth 2 points.*

☐0 ☐.5 ☐1 ☐.5 ☐2

We remind you that ...
Determine ...

PROJET

PROJET

+4/1/39+

EPFL

Teacher : **TEACHER**
EXAM - -
DATE
DURATION

B-1

Student 4

SCIPER : **999003** Room : **R-B** Signature :

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PROJET

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Respectez les consignes suivantes | Observe this guidelines | Beachten Sie bitte die unten stehenden Richtlinien

choisir une réponse | select an answer
Antwort auswählen

ne PAS choisir une réponse | NOT select an answer
NICHT Antwort auswählen

Corriger une réponse | Correct an answer
Antwort korrigieren

ce qu'il ne faut **PAS** faire | what should **NOT** be done | was man **NICHT** tun sollte

Pour votre examen, imprimez de préférence les documents compilés à l'aide de auto-multiple-choice.

First part: multiple choice questions

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Then

- ☐ the supremum of E belongs to E
- ☐ the minimum of E is 2
- ☐ E is closed
- ☐ 10 is a majorant of E

Question statement with several possible correct answers

- ☐ False Answer Choice
- ☐ wrong answer choice
- ☐ other correct answer choice
- ☐ False Answer Choice
- ☐ Correct answer choice

PROJET

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Let A be a bounded and non empty subset of $\mathbb{R}$.
Then $\inf A \in A$ and $\sup A \in A$.

☐ TRUE ☐ FALSE

Let $f\colon \mathbb{R} \to \mathbb{R}$ and $g\colon \mathbb{R} \to \mathbb{R}$ are two functions defined on all $\mathbb{R}$. If $f \circ g$ is injective, then g is injective.

☐ TRUE ☐ FALSE

PROJET

Third part, open questions

Answer in the empty space below. Your answer should be carefully justified, and all the steps of your argument should be discussed in details. Leave the check-boxes empty, they are used for the grading.

Question 4: *This question is worth 8 points.*

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8

We remind you that ...
Determine ...

PROJET

PROJET

Question 5: *This question is worth 2 points.*

☐0 ☐.5 ☐1 ☐.5 ☐2

We remind you that ...
Determine ...

PROJET

PROJET

+5/1/32+

EPFL

Teacher : **TEACHER**
EXAM - -
DATE
DURATION

B-2

Student 5

SCIPER : **999004** Room : **R-B** Signature :

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PROJET

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Respectez les consignes suivantes | Observe this guidelines | Beachten Sie bitte die unten stehenden Richtlinien

choisir une réponse | select an answer
Antwort auswählen

ne PAS choisir une réponse | NOT select an answer
NICHT Antwort auswählen

Corriger une réponse | Correct an answer
Antwort korrigieren

ce qu'il ne faut **PAS** faire | what should **NOT** be done | was man **NICHT** tun sollte

Pour votre examen, imprimez de préférence les documents compilés à l'aide de auto-multiple-choice.

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Question statement with several possible correct answers

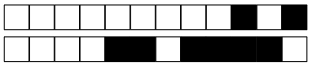
- ☐ False Answer Choice
- ☐ wrong answer choice
- ☐ other correct answer choice
- ☐ False Answer Choice
- ☐ Correct answer choice

Let the subset $E \subset \mathbb{R}$ defined by $E = \left\{ 2\left(1+\frac{1}{n}\right)^n : n \in \mathbb{N} \setminus \{0\} \right\}$.

Then

- ☐ 10 is a majorant of E
- ☐ E is closed
- ☐ the minimum of E is 2
- ☐ the supremum of E belongs to E

PROJET



+5/3/30+

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Let A be a bounded and non empty subset of $\mathbb{R}$.
Then $\inf A \in A$ and $\sup A \in A$.

☐ TRUE ☐ FALSE

Let $f\colon \mathbb{R} \to \mathbb{R}$ and $g\colon \mathbb{R} \to \mathbb{R}$ are two functions defined on all $\mathbb{R}$. If $f \circ g$ is injective, then g is injective.

☐ TRUE ☐ FALSE

PROJET

Pour votre examen, imprimez de préférence les documents compilés à l'aide de auto-multiple-choice.

Third part, open questions

Answer in the empty space below. Your answer should be carefully justified, and all the steps of your argument should be discussed in details. Leave the check-boxes empty, they are used for the grading.

Question 4: *This question is worth 8 points.*

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8

We remind you that ...
Determine ...

PROJET

PROJET

Question 5: *This question is worth 2 points.*

☐0 ☐.5 ☐1 ☐.5 ☐2

We remind you that ...
Determine ...

PROJET

PROJET

+6/1/25+

EPFL

Teacher : **TEACHER**
EXAM - MA
DATE
DURATION

B-3

Student 6

SCIPER : **999005** Room : **R-B** Signature :

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PROJET

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choisir une réponse | select an answer
Antwort auswählen

ne PAS choisir une réponse | NOT select an answer
NICHT Antwort auswählen

Corriger une réponse | Correct an answer
Antwort korrigieren

ce qu'il ne faut **PAS** faire | what should **NOT** be done | was man **NICHT** tun sollte

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First part: multiple choice questions

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Then

- ☐ the supremum of E belongs to E
- ☐ the minimum of E is 2
- ☐ E is closed
- ☐ 10 is a majorant of E

Question statement with several possible correct answers

- ☐ wrong answer choice
- ☐ False Answer Choice
- ☐ Correct answer choice
- ☐ False Answer Choice
- ☐ other correct answer choice

PROJET

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Let A be a bounded and non empty subset of $\mathbb{R}$.
Then $\inf A \in A$ and $\sup A \in A$.

☐ TRUE ☐ FALSE

Let $f\colon \mathbb{R} \to \mathbb{R}$ and $g\colon \mathbb{R} \to \mathbb{R}$ are two functions defined on all $\mathbb{R}$. If $f \circ g$ is injective, then g is injective.

☐ TRUE ☐ FALSE

PROJET

Third part, open questions

Answer in the empty space below. Your answer should be carefully justified, and all the steps of your argument should be discussed in details. Leave the check-boxes empty, they are used for the grading.

Question 4: *This question is worth 8 points.*

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8

We remind you that ...
Determine ...

PROJET

PROJET

Question 5: *This question is worth 2 points.*

☐0 ☐.5 ☐1 ☐.5 ☐2

We remind you that ...
Determine ...

PROJET

PROJET

+7/1/18+

EPFL

Teacher : **TEACHER**
EXAM - MT
DATE
DURATION

B-4

Student 7

SCIPER : **999006** Room : **R-B** Signature :

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PROJET

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choisir une réponse | select an answer Antwort auswählen	ne PAS choisir une réponse | NOT select an answer NICHT Antwort auswählen	Corriger une réponse | Correct an answer Antwort korrigieren
ce qu'il ne faut **PAS** faire | what should **NOT** be done | was man **NICHT** tun sollte		

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First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Question statement with several possible correct answers

- ☐ other correct answer choice
- ☐ Correct answer choice
- ☐ False Answer Choice
- ☐ wrong answer choice
- ☐ False Answer Choice

Let the subset $E \subset \mathbb{R}$ defined by $E = \left\{ 2\left(1+\frac{1}{n}\right)^n : n \in \mathbb{N} \setminus \{0\} \right\}$.

Then

- ☐ E is closed
- ☐ the minimum of E is 2
- ☐ 10 is a majorant of E
- ☐ the supremum of E belongs to E

PROJET

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Let A be a bounded and non empty subset of $\mathbb{R}$.
Then $\inf A \in A$ and $\sup A \in A$.

☐ TRUE ☐ FALSE

Let $f\colon \mathbb{R} \to \mathbb{R}$ and $g\colon \mathbb{R} \to \mathbb{R}$ are two functions defined on all $\mathbb{R}$. If $f \circ g$ is injective, then g is injective.

☐ TRUE ☐ FALSE

PROJET

Third part, open questions

Answer in the empty space below. Your answer should be carefully justified, and all the steps of your argument should be discussed in details. Leave the check-boxes empty, they are used for the grading.

Question 4: *This question is worth 8 points.*

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8

We remind you that ...
Determine ...

PROJET

PROJET

Question 5: *This question is worth 2 points.*

☐$_{0}$ ☐$_{.5}$ ☐$_{1}$ ☐$_{.5}$ ☐$_{2}$

We remind you that ...
Determine ...

PROJET

PROJET

+8/1/11+

EPFL

Teacher : **TEACHER**
EXAM - SV
DATE
DURATION

B-5

Student 8

SCIPER : **999007** Room : **R-B** Signature :

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PROJET

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Let the subset $E \subset \mathbb{R}$ defined by $E = \left\{ 2\left(1+\frac{1}{n}\right)^n : n \in \mathbb{N} \setminus \{0\} \right\}$.

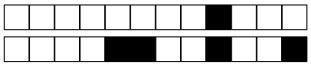
Then

- ☐ the minimum of E is 2
- ☐ E is closed
- ☐ 10 is a majorant of E
- ☐ the supremum of E belongs to E

Question statement with several possible correct answers

- ☐ wrong answer choice
- ☐ Correct answer choice
- ☐ False Answer Choice
- ☐ other correct answer choice
- ☐ False Answer Choice

PROJET



First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Let A be a bounded and non empty subset of $\mathbb{R}$.
Then $\inf A \in A$ and $\sup A \in A$.

☐ TRUE ☐ FALSE

Let $f\colon \mathbb{R} \to \mathbb{R}$ and $g\colon \mathbb{R} \to \mathbb{R}$ are two functions defined on all $\mathbb{R}$. If $f \circ g$ is injective, then g is injective.

☐ TRUE ☐ FALSE

PROJET

Third part, open questions

Answer in the empty space below. Your answer should be carefully justified, and all the steps of your argument should be discussed in details. Leave the check-boxes empty, they are used for the grading.

Question 4: *This question is worth 8 points.*

☐0 ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8

We remind you that ...
Determine ...

PROJET

PROJET

Question 5: *This question is worth 2 points.*

☐0 ☐.5 ☐1 ☐.5 ☐2

We remind you that ...
Determine ...

PROJET

PROJET

+9/1/4+

EPFL

Teacher : **TEACHER**
EXAM - -
DATE
DURATION

B-6

Student 9

SCIPER : **999008** Room : **R-B** Signature :

Do not turn the page before the start of the exam. This document is double-sided, has 4 pages, the last ones possibly blank. Do not unstaple.

PROJET

- Place your student card on your table.
- **No other paper materials** are allowed to be used during the exam.
- Using a **calculator** or any electronic device is not permitted during the exam.
- For the **multiple choice** questions, we give :
  +3 points if your answer is correct,
  0 points if you give no answer or more than one,
  −1 points if your answer is incorrect.
- For the **true/false** questions, we give :
  +1 points if your answer is correct,
  0 points if you give no answer or more than one,
  −1 points if your answer is incorrect.
- Use a **black or dark blue ballpen** and clearly erase with **correction fluid** if necessary.
- If a question is wrong, the teacher may decide to nullify it.

Respectez les consignes suivantes | Observe this guidelines | Beachten Sie bitte die unten stehenden Richtlinien		
choisir une réponse | select an answer Antwort auswählen	ne PAS choisir une réponse | NOT select an answer NICHT Antwort auswählen	Corriger une réponse | Correct an answer Antwort korrigieren
ce qu'il ne faut **PAS** faire | what should **NOT** be done | was man **NICHT** tun sollte		

Pour votre examen, imprimez de préférence les documents compilés à l'aide de auto-multiple-choice.

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Question statement with several possible correct answers

- ☐ wrong answer choice
- ☐ False Answer Choice
- ☐ False Answer Choice
- ☐ other correct answer choice
- ☐ Correct answer choice

Let the subset $E \subset \mathbb{R}$ defined by $E = \left\{ 2\left(1+\frac{1}{n}\right)^n : n \in \mathbb{N} \setminus \{0\} \right\}$.

Then

- ☐ 10 is a majorant of E
- ☐ the supremum of E belongs to E
- ☐ the minimum of E is 2
- ☐ E is closed

PROJET

First part: multiple choice questions

For each question, mark the box corresponding to the correct answer. Each question has **exactly one** correct answer.

Let $f\colon \mathbb{R} \to \mathbb{R}$ and $g\colon \mathbb{R} \to \mathbb{R}$ are two functions defined on all $\mathbb{R}$. If $f \circ g$ is injective, then g is injective.

☐ TRUE ☐ FALSE

Let A be a bounded and non empty subset of $\mathbb{R}$.
Then $\inf A \in A$ and $\sup A \in A$.

☐ TRUE ☐ FALSE

PROJET

Third part, open questions

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Determine ...

PROJET

PROJET

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☐0 ☐.5 ☐1 ☐.5 ☐2

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PROJET

Pour votre examen, imprimez de préférence les documents compilés à l'aide de auto-multiple-choice.

+10/1/57+

EPFL

Teacher : **TEACHER**
EXAM - -
DATE
DURATION

B-7

Student 10

SCIPER : **999009** Room : **R-B** Signature :

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choisir une réponse | select an answer
Antwort auswählen

ne PAS choisir une réponse | NOT select an answer
NICHT Antwort auswählen

Corriger une réponse | Correct an answer
Antwort korrigieren

ce qu'il ne faut **PAS** faire | what should **NOT** be done | was man **NICHT** tun sollte

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PROJET

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PROJET

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