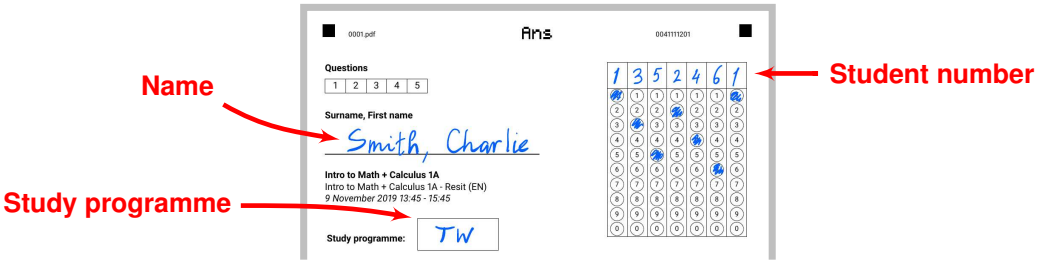
UNIVERSITY OF TWENTE.

Remove this page

Instructions

- This is a cover page. **Remove it before you submit your work**.
  You can use the flip side as scrap paper.
- Before you enter a solution, elaborate the answer on scrap paper. **Do not submit scrap paper**.
- Use a **blue** or **black** pen to fill in your answer. **Do not use a pencil**.
- Check your answer whenever possible.
- Enter your name (surname first), student number and study programme as follows:



Question types

Final answer

In the text frame below the question, you provide only *one* answer. Do not write down a calculation, explanation or motivation. If you do write down a calculation, explanation or motivation, it will not be taken into account for grading. If you fill in an equation, only the right-most member will be regarded as the answer.

Open answer

You provide a calculation or motivation in the text frame below the question. The calculation or motivation will be graded. Any text outside the frame will be ignored.

Multiple choice

Uses round markers. Only one answer is correct. Choose the correct answer by marking it with a black or blue pen.

Correcting your answer

If you need to correct a multiple choice/response question, crossout the wrong answer, and mark the right answer with an arrow, like this:

Questions

1	2	3	4	5	6	7	8	9	10
11	12								

1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9
0	0	0	0	0	0	0

Surname, First name

Calculus 1B (Ca1B)
Calculus 1B Practice test (Eng)

Study programme:

- Write your **student number** in the top right section, colouring in the correct number sequence.
- Use a black or blue pen. Do not use a pencil.
- The use of a calculator or any other electronic device is not allowed.
- Please turn off your cell phone.

- This exam consists of 11 questions.
- Question 12 is extra writing space. Clearly refer to it if you make use of it.

- This exam consists of a total of 36 points:
- Multiple Choice (10 points): Q1, Q3, Q8 and Q10
- Final Answer (8 points): Q2, Q4 and Q7
- Open (18 points): Q5, Q6, Q9 and Q11.

- **Do not remove this page**

Question 1

2p The expression $\sum_{k=1}^{n} \frac{k^2+kn}{n^3}$ is a Riemann sum for a function on an interval. Decide which integral generates this Riemann sum

- ○ A) $\int_0^1 \frac{x^2+x}{x^3}dx$
- ○ B) $\int_0^n \frac{x^2+x}{x^3}dx$
- ○ C) $\int_0^1 \frac{x^2+x}{x^2}dx$
- ○ D) $\int_0^n \frac{x^2+x}{x^2}dx$
- ○ E) $\int_0^1 \frac{x^2+1}{x}dx$
- ○ F) $\int_0^1 (x^2+1)dx$
- ○ G) $\int_0^1 (x^2+x)dx$
- ○ H) $\int_0^n (x^2+x)dx$

Question 2

Only write your final answer to the question in the box below.

2p Compute $\int_{-3}^{0} (1+\sqrt{9-x^2})dx =$

Question 3

3p Determine $\frac{dy}{dx}$ in case $y = \int_0^{16x^4} (e^t\sqrt{t})dt$

Choose from the alternatives below

- ○ A) $4x^2e^{4x^2}$
- ○ B) $4x^4e^{4x^4}$
- ○ C) $256x^5e^{16x^4}$
- ○ D) $256x^7e^{16x^4}$
- ○ E) $64x^3e^{4x^4}$
- ○ F) $64x^3e^{16x^4}$
- ○ G) $256x^7e^{4x^2}$
- ○ H) $256x^5e^{4x^2}$

Question 4

Only write your final answer to the question in the box below.

2p Determine $\int (x\sqrt{1+x^2})dx =$

Question 5

4p Determine $\int_1^e (ln(x))^2 dx =$

Question 6

5p Find the Taylor polynomial of order 3 generated by $f(x) = \sqrt{(1-x)}$ at $a = 0$

Question 7

Only write your final answer to the question in the box below.

4p Solve the initial value problem

$$\begin{cases} \frac{dy}{dx} = \frac{y}{x} + x \sin x \\ y(\pi) = 0 \end{cases}$$

$y =$

Question 8

3p Find the polar form for $\frac{z}{w}$ in case $z = \sqrt{3} + i$ and $w = 1 + \sqrt{3}\, i$
Choose from the alternatives below.

- ○ A) $2e^{-\frac{\pi}{6}i}$
- ○ B) $\frac{1}{2}e^{-\frac{\pi}{6}i}$
- ○ C) $2e^{\frac{\pi}{6}i}$
- ○ D) $\frac{1}{2}e^{\frac{\pi}{6}i}$
- ○ E) $4e^{-\frac{\pi}{6}i}$
- ○ F) $e^{\frac{\pi}{6}i}$
- ○ G) $e^{-\frac{\pi}{6}i}$
- ○ H) $4e^{\frac{\pi}{6}i}$

Question 9

3p Find all solutions in $\mathbb{C}$ of the equation $z^4 - 4 = 0$

Question 10

2p Which function is a particular solution to $y'' + y' = x$

- ○ A) $y = x$
- ○ B) $y = \frac{1}{2}x^2$
- ○ C) $y = x - e^{-x}$
- ○ D) $y = \frac{1}{2}x^2 - e^{-x}$
- ○ E) $y = 1 - e^{-x} + x$
- ○ F) $y = 1 - x + \frac{1}{2}x^2$
- ○ G) $y = 1 + x - \frac{1}{2}x^2$
- ○ H) $y = x - \frac{1}{2}x^2$

Question 11

6p Determine the unique solution to the problem
$y'' + 5y' + 4y = 8\sin x + 2\cos x$
$y(0) = 0$
$y'(0) = 0$

Extra writing space

Clearly refer to this section if you use it.