

## Test 5B [2020-01-19] Definite integral

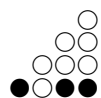


## INSTRUCTIONS

## READ CAREFULLY

- This questionnaire contains 10 problems, each one of them has 5 different answers; only one of those answers is right, the others are wrong.
- Each right answer is worth **5 points**, each wrong answer is worth **0 points** and each problem left unanswered is worth **1 point**. If the answers are delivered after the time limit set by the teacher, a penalty of one point for each minute of lateness will be applied.
- For each problem, **blacken the square** corresponding to the answer believed to be right in the grid printed in the back side of this sheet, with a black or dark blue pen or marker.  
In case of errors, an answer may be cancelled by blackening the circle below (warning: cancelled answers can not be turned back on); thereafter a new answer may be given.  
Avoid overstepping the borders of the boxes and draw no other marks in the answers' sheet.
- Correction fluid is forbidden. Use questions' sheets for drafts (as well as any additional sheets, handing them over at the end of the test). Use of pocket calculators is allowed, while smartphones and other means of communications are not.  
Only the answers accurately copied into the answers' grid will be assessed.

	A	B	C	D	E
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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1. For which value of  $p$  does  $\int_0^1 \frac{1}{x^p} dx = 1.25$  ?

- A  $p = 2$
- B None of the others.
- C  $p = 0.5$
- D  $p = 0.2$
- E  $p = 2.5$

2.

$$\int_0^8 \frac{dx}{\sqrt{1+x}} =$$

- A 1
- B 6
- C  $\frac{3}{2}$
- D 4
- E 2

3.

$$\int_{-1}^1 \frac{dx}{\sqrt[3]{x^2}} =$$

- A Diverges to infinity.
- B 2
- C 0
- D Does not exist.
- E 6

4.

$$\int_0^{\frac{\pi}{2}} \frac{dx}{\cos^2 x} =$$

- A 1
- B Does not exist.
- C Diverges to infinity.
- D  $\frac{\pi}{4}$
- E 2

5. If  $\int_{-2}^2 (x^7 + k) dx = 16$ , then  $k =$

- A 12
- B 0
- C -4
- D 4
- E -12

6. Evaluate the integral:

$$\int_0^1 \frac{x}{x^2 + 9} dx.$$

- A  $\ln 1 - \ln 0$
- B None of the others.
- C  $\frac{1}{2}(\ln 1 - \ln 0)$
- D  $\ln 10 - \ln 9$
- E  $\frac{1}{2}(\ln 10 - \ln 9)$

7. The mean value of  $\sqrt{x}$  over the interval  $0 \leq x \leq 2$  is:

- A  $\frac{4}{3}\sqrt{2}$
- B  $\frac{1}{3}\sqrt{2}$
- C  $\frac{1}{2}\sqrt{2}$
- D 1
- E  $\frac{2}{3}\sqrt{2}$

8. Evaluate the integral:

$$\int_0^4 \frac{x}{x+9} dx.$$

- A  $\frac{1}{9 \ln 13} - \ln 3$
- B  $4 - 26 \ln 3 + 3 \ln 18$
- C  $\frac{4}{13}$
- D  $13 + \ln 3 - 18 \ln 2$
- E  $4 + 18 \ln 3 - 9 \ln 13$

9. Evaluate:

$$\int_0^1 xe^x dx.$$

- A None of the others.
- B  $2e - 1$
- C 0
- D 1
- E  $e$

10. What is the mean value of  $3t^3 - t^2$  over the interval  $-1 \leq t \leq 2$ ?

- A  $\frac{7}{2}$
- B  $\frac{33}{4}$
- C  $\frac{11}{4}$
- D 16
- E 8