

Week: March 22 – March 28, 2021

## Topic: **Double integral**

The below provided instructions should guide you through studying the topic. For additional explanation, clarification and extra material contact the Lecture/Tutorial teacher by email or the MS-Teams platform for live online consultation (see webpage for the link).

[https://mat.nipax.cz/mathematics:mathematics\\_ii](https://mat.nipax.cz/mathematics:mathematics_ii)

This week we will start the second large chapter of this semester, which will be the integral calculus of functions of multiple variables. This week we will start with the multidimensional extension of Riemann integral. We will repeat the essential properties for functions of single variable. Then we will introduce the double integral. We will formulate the Fubini theorem for conversion of double integral into iterated integral. We will also briefly discuss some of the physical and geometrical applications of double integral. In case we will have enough time, we will also introduce the elementary coordinate transformations for double integral. More details and other types of integrals will follow in the upcoming weeks.

1) Read and learn the explanation from the textbook. Scanned pages can be found on the web page.

[https://mat.nipax.cz/media/mathematics:pages\\_48-57.pdf](https://mat.nipax.cz/media/mathematics:pages_48-57.pdf)

Additional material and alternative explanation with many figures and exercises can be found in (free) online available textbooks

<http://www.math.wisc.edu/~keisler/calc.html>

namely chapter 12 [http://www.math.wisc.edu/~keisler/chapter\\_12.pdf](http://www.math.wisc.edu/~keisler/chapter_12.pdf)

<https://openstax.org/books/calculus-volume-3/pages/1-introduction>

namely chapter 5 <https://openstax.org/books/calculus-volume-3/pages/5-introduction>

2) Take a look at the solved exercises from our collection of examples

questions: [https://mat.nipax.cz/media/double\\_integral.pdf](https://mat.nipax.cz/media/double_integral.pdf)

complete solutions (in Czech): [https://mat.nipax.cz/media/dvojny\\_intregral.pdf](https://mat.nipax.cz/media/dvojny_intregral.pdf)

3) As a training solve (at least) the following exercises.

272, 273, 276 – solved without substitution (transformation)

285, 288, 292 – solved with substitution (transformation)

4) As a long term homework, to be delivered at specified deadline, solve all the corresponding exercises from sample exams from our webpage

[https://mat.nipax.cz/media/mathematics:ma2\\_exam\\_1n\\_en.pdf](https://mat.nipax.cz/media/mathematics:ma2_exam_1n_en.pdf)

[https://mat.nipax.cz/media/mathematics:ma2\\_exam\\_2n\\_en.pdf](https://mat.nipax.cz/media/mathematics:ma2_exam_2n_en.pdf)

[https://mat.nipax.cz/media/mathematics:ma2\\_exam\\_3n\\_en.pdf](https://mat.nipax.cz/media/mathematics:ma2_exam_3n_en.pdf)

***The delivery of all sample exams, completely and correctly solved (by yourself) is necessary (but not sufficient) condition for obtaining the assessment from tutorials.***

**DEADLINE: March 31, 2021 for the first part of the homework  
(1st and 2nd exercise from Exam 1, Exam 2 and Exam 3).**