

Course exam and general exam 19.2.2024 klo 9.00–12.00.

**Course exam: the five best problems will be included in the evaluation.**

**General exam: Do all six problems.**

All participants of the lecture course in the period III/2024 can do all six problems. The evaluation is calculated with that option that gives the highest score: either "five best problems + exercise points" or "6 problems only".

**No calculators or notes of any kind are allowed.**

Each problem is worth 6 points.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

**Extra help:** Some values of trigonometric functions:

$\alpha$	$-\frac{\pi}{4}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$
$\sin(\alpha)$	$-1/\sqrt{2}$	$-1/2$	0	$1/2$	$1/\sqrt{2}$	$\sqrt{3}/2$	1	0
$\cos(\alpha)$	$1/\sqrt{2}$	$\sqrt{3}/2$	1	$\sqrt{3}/2$	$1/\sqrt{2}$	$1/2$	0	$-1$
$\tan(\alpha)$	$-1$	$-1/\sqrt{3}$	0	$1/\sqrt{3}$	1	$\sqrt{3}$	$-$	0

**Other formulas without explanation:**

$$ax^2 + bx + c = 0 \Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$dA = r dr d\theta$$

$$dV = r dr d\theta dz$$

$$dV = r^2 \sin \phi dr d\theta d\phi$$

**Note 1:** Answering the course feedback gives one exam point!

**Note 2:** You can retake the course exam when there is a general exam at April. On the first retake the exercise points of the course are valid. To retake the exam you have to enroll to the exam through Sisu.