

There are two Parts.

For Part I you have to do 8 problems out of the 12. You can earn 3 points for each problem. For part II you have to do 1 out of 2 problems. You can earn 12 points for this problem.

I want to ask you to number your awnsering pages.

Don't make more problems then you have to do. Only the first 8 you do for part one en the first you do for part two will be considered.

When your result is 18 points or more you have passed the exam.

This exam consists out of 3 pages.

Part I.

1. Given is the function $f(x) = 5x^3 - 30x^2 + 18x + 35$

- Find the coordinates of the point of inflection A.
- Find the equation of the tangent in point A.

2. Solve the following inequality:

$$\sqrt{2x + 8} \geq x$$

3. Given is the Matrix $A = \begin{pmatrix} 2 & -5 \\ 1 & 4 \end{pmatrix}$ and the vector $\underline{v} = \begin{pmatrix} 4 \\ -3 \end{pmatrix}$

- Calculate $|\underline{v}|$ and $|\underline{Av}|$.
- Calculate the inverse of A.

4. Given is the function $f: x \rightarrow \frac{x+4}{x-3}$

- Draw the graph of f
- Solve the inequality $f(x) \geq -2$

5. Solve the inequality

$$\ln(2x^2 + 6x + e^2) > 2$$

6. Given is the function $f: x \rightarrow 2|x+2| - |x-1|$

Draw the graph of f in the x-y plane.

7. A vase contains 3 blue and 7 red marbles.

There are taken 3 times one marble without putting the marbles back.

Calculate:

- a. $P(3 \text{ red})$
- b. $P(1 \text{ red} \wedge 2 \text{ blue})$
- c. Give the answers to the questions a and b if the marbles are put back.

8. Given is the line $\ell \equiv 3y - 5x = 15$

- a. Draw this line in the x-y plane.
- b. Find the equation of the line m perpendicular to ℓ intersecting $A(4, -1)$.

9. Given is the function $f(x) = 5x^6 e^{2x}$

Find the equation of the normal in point A on the graph of f
The x-coordinate of A = 2

10. Draw the graph of:

$$f: x \rightarrow -1 + {}^2\log(2 - x)$$

11. From an arithmetic progression is given:

$$t_3 = 12 \text{ and } t_8 = -8$$

- a. Calculate t_{12} .
- b. Calculate S_{12} .

12. Calculate the first derivative of the following functions:

a. $f(x) = (5x^7 - 4x^3 + 9)^{10}$

b. $f(x) = {}^3\log \frac{2x + 3}{x - 5}$

Part II.

1. Calculate the following Integrals:

a. $\int_1^3 \frac{8x - 20}{x^2 - 5x + 7} dx$

b. $\int_1^2 \frac{x^3 + 27}{x + 3} dx$

Given are the functions $f(x) = x^2 - 7x + 10$ and $g(x) = 5x - 22$

c. Calculate the surface of the area between the graphs of f and g .

2. Given is the function $f(x) = x^4 - 18x^2 + 2$

a. Calculate the coordinates of the turningpoints.

b. Are these turningpoints maximum- or minimumpoints? Explain your answer.

c. A is a point of the graph of f . $X_A = 1$. Find the equation of the tangent in A.

d. Calculate the coordinates of the Points of Inflection.