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.

Would you be so kind to number your pages?

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 $f(x) = \ln (x^2 + 2x)$

   Find the equation of the normal in point A with x-coordinate 5.

   Point A is on the graph of f.

2. Solve the following inequality:

   $\sqrt{x + 6} \leq x$

3. Given is the function $f(x) = \dfrac{2x + 7}{x - 3}$

   a. Draw the graph of f.

   b. Solve the inequality $3 < f(x) \leq 5$.

4. Someone is throwing two dice.

   Stochastic variable X is the sum of the numbers on the dice.

   Stochastic variable Y is the product of the numbers on the dice.

   Are the events X = 5 and Y = 4 independent?

   Explain your awnser.

5. Solve the inequality

   $\dfrac{x^2 - 2x - 17}{x + 2} \leq 2$

6. From a geometric progression is given:

$$t_2 = 25 \text{ and } t_4 = \frac{1}{5}$$

  a. Calculate a and r.

  b. Calculate the limitsum S.

7. a. Draw the graph of:

   $$f: x \longrightarrow {}^2\log(x + 3)$$

  b. Give the equation of the asymptote.

8. Solve the inequality

   $${}^2\log(x^2 - 3x + 66) > 6$$

9. Given is de function $f(x) = x^3 e^{2x+5}$

   Find the equation of the tangent in point A on the graph of f

   The x-coordinate of A = -1

10. A vase contains 5 red and 15 blue balls.

    There is 10 times a ball taken and put back.

    Stochast X is the number of blue balls.

    Calculate $P(X \geq 2)$

11. Solve the following equations:

    a. $x^2 + 4x - 12 = 0$

    b. $x^4 - 36x^2 + 275 = 0$

    c. $x^6 + 8x^3 - 9 = 0$

12. Calculate the first derivative of the following functions:

    a. $f(x) = 5^{2x^2 - 4x + 3}$

    b. $f(x) = {}^3\log \dfrac{2x^2 - 12}{x^3 - 4}$

Part II.

1. The following functions are given:

   $f: x \longrightarrow x^3 - 9x$ and $g: x \longrightarrow x^2 + 3x$

   a. Calculate the coordinates of the intersectionpoints of the graph of f with the x-axis.

   b. Calculate the extremes of the function f.

   c. Calculate the coordinates of the point of inflection of the graph of f.

   d. Draw the graph of f.

   e. Calculate the coordinates of the intersectionpoints of the graphs of f and g.

   f. Draw the graph of g in the figure of d.

   g. Solve the inequality:

      $f(x) < g(x)$

   h. Calculate the sum of the surface areas between the graphs of f and g.

2. The following matrix is given:

   $A = \begin{pmatrix} 7 & 11 \\ -1 & -3 \end{pmatrix}$

   a. Calculate the determinant of A.

   b. Calculate the inverse of A.

   c. Calculate the eigenvalues of A

   d. Calculate the eigenvectors of A