1. Simplify (the letters a, b, c, x, y, z and n are positive constants)

a. $\dfrac{a-1}{2a} - \dfrac{2b+1}{5b} + \dfrac{2a+5b}{10ab}$

b. $\dfrac{x^6\sqrt{yz^2}}{x^2\sqrt{y^3}}$

c. $n - \dfrac{n}{1-\dfrac{1}{n}}$

2. Factorize:

a. $x^4 - x^3 - 2x^2$

b. $a^2b - 4b^3$

3. Solve:

a. $x^2 + 1{,}17x = 0$

b. $\left(x - \tfrac{3}{4}\right)^2 = 0$

c. $x^2 + 2x - 7 = 0$

4. solve the next inequalities:

a. $x < \dfrac{x+2}{x}$

b. $e^{4x-10} > 0$

c. $\ln(4-x) < 0$

5. Differentiate and simplify the result: $f(x) = \dfrac{x}{\left(1+x^2\right)^2}$

6.   Let $y = f(x) = 50 - 5 \cdot \sqrt[3]{x}$

(a) Find y for $x = 27$.

(b) Find $\dfrac{dy}{dx}$ for $x = 27$. Round your answer on 3 decimals.

(c) Give an approximation of the change of y if x increases outgoing from $x = 27$ with 0.02
Round your answer on 3 decimals and give the relationship with part (b) of this problem.

(d) Find for which x the function $g(x) = x \cdot f(x)$ has a maximum

7. Find the equation of the tangent at the graph of the function: $f(x) = e^{2x}(x-1)^2$
where $x = 2$.

8. Let: $f(x) = 6x^4 - 8x^3 + 1$

a. Find the stationary points, so solve the equation $f'(x) = 0$

b. Find the extreme values of the function and classify (maximum or minimum).