**Discipline: Calculus-1**

**Exam Ticket**

1. Find limits of functions: a) $\lim\limits_{x\to 1^+} x^{1/(1-x)}$ b) $\lim\limits_{x\to 0}\dfrac{\sqrt{x^2+9}-3}{\sqrt{x^2+1}-1}$

2. Find derivatives of functions: a) $y=\sin x+\dfrac{1}{2}\cos^2 x$ b) $y=\ln\dfrac{\sqrt{x^2+2x}}{x+1}$

3. Graph the following function using all the steps in the graphing procedure: $y=\dfrac{2x^2+x-1}{x^2-1}$

4. Find indefinite integrals: a) $\int\dfrac{x^4+81}{x(x^2+9)^2}dx$ b) $\int x^3\ln x dx$

5. Calculate the following integrals: a) $\int\limits_0^8\left(\dfrac{1}{3\sqrt[3]{x^2}}-1\right)dx$; b) $\int\limits_0^{\infty}\dfrac{dx}{x^2+1}$