Matematiikan perusmetodit/mat.

Harjoitus 12 syksy 2010

A osa:

1. Integroi

   a) $\int \frac{1}{1+a^2x^2}\,dx$, b) $\int \frac{dx}{2+x^2}$, c) $\int \frac{x^2}{x^2+1}\,dx$.

2. Integroi

   a) $\int x\sin x\,dx$, b) $\int x^2\sin x\,dx$, c) $\int(2x+1)\sin 2x\,dx$.

3. Integroi

   a) $\int xe^{-\frac{x}{2}}\,dx$, b) $\int x^2e^{2x}\,dx$, c) $\int x^3e^x\,dx$.

4. Integroi

   a) $\int \ln x^2\,dx$, b) $\int x^2\ln x\,dx$, c) $\int \frac{\ln(1+x^2)}{x^2}\,dx$.

5. Integroi

   a) $\int \arctan x\,dx$, b) $\int \arcsin x\,dx$.

6. Integroi

   a) $\int \cos(\ln x)\,dx$, b) $\int e^x\cos x\,dx$.

7. Integroi

   a) $\int \frac{x}{x+\sqrt{x}}\,dx$, b) $\int \frac{1}{1+\sqrt{x-1}}\,dx$, c) $\int \frac{1}{1+\sqrt[3]{x+1}}\,dx$, d) $\int \frac{x}{(3x-1)\sqrt{3x-1}}\,dx$.

8. Integroi

   a) $\int \frac{dx}{x(x-1)}$, b) $\int \frac{1+x^2}{x(1+x)}\,dx$.

Matematiikan perusmetodit/mat.

Harjoitus 12 syksy 2010
B osa:

1. Integroi

   a) $\int \frac{1}{\sqrt{9-x^2}}\,dx$, b) $\int \frac{1}{\sqrt{x}+\sqrt[3]{x}}\,dx$, c) $\int \sqrt{2-x^2}\,dx$, d) $\int \frac{4^x+1}{2^x+1}\,dx$,
   f) $\int \sqrt{x^2+2}\,dx$.

2. Integroi

   a) $\int \frac{x^2+7x}{(x-1)(x+1)^2}\,dx$, b) $\int \frac{5x-4}{(x+2)(x^2+3)}\,dx$, c) $\int \frac{x+1}{x^2-x+1}\,dx$.

3. Johda osittaisintegroinnin avulla palautuskaavat

   a) $\int \sin^n x\,dx = -\frac{1}{n}\sin^{n-1} x\cos x + \frac{n-1}{n}\int \sin^{n-2} x\,dx$, $n = 2, 3, \ldots$,
   b) $\int \cos^n x\,dx = \frac{1}{n}\cos^{n-1} x\sin x + \frac{n-1}{n}\int \cos^{n-2} x\,dx$, $n = 2, 3, \ldots$.