Matematiikan propedeuttinen kurssi (MATY010)
KAAVOJA

Logaritmit: ($a > 0$, $a \neq 1$, $b > 0$, $b \neq 1$, $x > 0$, $y > 0$, $p \in \mathbb{R}$)

$$\log_a(xy) = \log_a x + \log_a y$$
$$\log_a\left(\frac{x}{y}\right) = \log_a x - \log_a y$$
$$\log_a(x^p) = p\log_a x$$
$$\log_a x = \frac{\log_b x}{\log_b a}$$
$$\ln x = \log_e x$$
$$\lg x = \log_{10} x$$

Derivointi:

$$D(k) = 0 \quad \text{kaikilla } k \in \mathbb{R}$$
$$D(x^r) = rx^{r-1} \quad \text{kaikilla } r \in \mathbb{R}$$
$$D(e^x) = e^x$$
$$D(\ln|x|) = \frac{1}{x} \quad \text{kun } x \neq 0$$
$$D(\sin x) = \cos x$$
$$D(\cos x) = -\sin x$$
$$D(f(x) + g(x)) = D(f(x)) + D(g(x))$$
$$D(k \cdot f(x)) = k \cdot D(f(x)) \quad \text{kaikilla } k \in \mathbb{R}$$
$$D(f(x) \cdot g(x)) = f'(x)g(x) + g'(x)f(x)$$
$$D\left(\frac{f(x)}{g(x)}\right) = \frac{f'(x)g(x) - g'(x)f(x)}{\big(g(x)\big)^2}$$
$$D(\big(g(f(x))\big)) = f'(x) \cdot g'(f(x))$$

Integrointi:

$$\int k\,dx = kx + C \quad \text{kaikilla } k \in \mathbb{R}$$
$$\int x^r\,dx = \frac{1}{r+1}x^{r+1} + C, \quad \text{kun } r \neq -1$$
$$\int x^{-1}\,dx = \ln|x| + C$$
$$\int e^x\,dx = e^x + C$$
$$\int \sin x\,dx = -\cos x + C$$
$$\int \cos x\,dx = \sin x + C$$
$$\int f(x) + g(x)\,dx = \int f(x)\,dx + \int g(x)\,dx$$
$$\int k \cdot f(x)\,dx = k \cdot \int f(x)\,dx \quad \text{kaikilla } k \in \mathbb{R}$$
$$\int f'(x) \cdot g'(f(x))\,dx = g(f(x)) + C$$
$$\int_a^b f(x)\,dx = F(b) - F(a)$$

Suoran yhtälöitä:

$$Ax + By + C = 0$$
$$y = kx + b$$
$$y - y_0 = k(x - x_0)$$

Ympyrän yhtälöitä:

$$x^2 + y^2 + Ax + By + C = 0$$
$$(x - x_0)^2 + (y - y_0)^2 = r^2$$