# Formúlublað í STÆ 403

**Diffurreglur**

| f(x) | f′(x) |
|---|---|
| $\sqrt{x}$ | $\frac{1}{2\sqrt{x}}$ |
| $x^a$ | $a \cdot x^{a-1}$ |
| sin(x) | cos(x) |
| cos(x) | -sin(x) |
| tan(x) | $\frac{1}{\cos^2(x)}$ $1+\tan^2(x)$ |
| $e^x$ | $e^x$ |
| ln(x) | $\frac{1}{x}$ |
| $a^x$ | $a^x \cdot \ln(a)$ |
| $\log_a(x)$ | $\frac{1}{x \cdot \ln(a)}$ |

| j(x) | j′(x) |
|---|---|
| f(x)+g(x) | $f'(x)+g'(x)$ |
| f(x)–g(x) | $f'(x)-g'(x)$ |
| $f(x) \cdot g(x)$ | $f'(x) \cdot g(x) + f(x) \cdot g'(x)$ |
| $\frac{f(x)}{g(x)}$ | $\frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{(g(x))^2}$ |
| $f \circ g(x)$ | $f'(g(x)) \cdot g'(x)$ |
| $(f^{-1})'(y)$ | $\frac{1}{f'(x)}$ |

$$f'(x_0) = \lim_{x \to x_0} \frac{f(x) - f(x_0)}{x - x_0}$$

Snertill:
$$y - f(x_0) = f'(x_0)(x - x_0)$$

**Hornaföll:**

$$\sin^2(v) + \cos^2(v) = 1$$
$$\tan^2(v) + 1 = \frac{1}{\cos^2(v)}$$

$$\sin(2v) = 2\sin(v) \cdot \cos(v)$$
$$\cos(2v) = \cos^2(v) - \sin^2(v)$$
$$\cos(2v) = 1 - 2\sin^2(v)$$
$$\cos(2v) = 2\cos^2(v) - 1$$
$$\tan(2v) = \frac{2\tan(v)}{1 - \tan^2(v)}$$

$$\sin(u) - \sin(v) = 2\cos\left(\frac{u+v}{2}\right) \cdot \sin\left(\frac{u-v}{2}\right)$$
$$\cos(u) - \cos(v) = -2\sin\left(\frac{u+v}{2}\right) \cdot \sin\left(\frac{u-v}{2}\right)$$

$$\sin(u) + \sin(v) = 2\sin\left(\frac{u+v}{2}\right) \cdot \cos\left(\frac{u-v}{2}\right)$$
$$\cos(u) + \cos(v) = 2\cos\left(\frac{u+v}{2}\right) \cdot \cos\left(\frac{u-v}{2}\right)$$

## Lograreglur

$$\log(a \cdot b) = \log(a) + \log(b)$$
$$\log\left(\frac{a}{b}\right) = \log(a) - \log(b)$$
$$\log(a^n) = n \cdot \log(a)$$

# Formúlublað í STÆ 503

| f(x) | F(x) |
|---|---|
| $x^a$ | $\frac{1}{a+1}x^{a+1}$ |
| $\sin(x)$ | $-\cos(x)$ |
| $\cos(x)$ | $\sin(x)$ |
| $\frac{1}{\cos^2(x)}$<br>$1+\tan^2(x)$ | $\tan(x)$ |
| $e^x$ | $e^x$ |
| $\frac{1}{x}$ | $\ln\lvert x\rvert$ |
| $a^x$ | $\frac{a^x}{\ln(a)}$ |
| $\sin(ax),\ a \neq 0$ | $-\frac{1}{a}\cos(ax)$ |
| $\cos(ax),\ a \neq 0$ | $\frac{1}{a}\sin(ax)$ |
| $e^{ax},\ a \neq 0$ | $\frac{1}{a}e^{ax}$ |
| $\frac{1}{\sqrt{1-x^2}}$ | $\arcsin(x)$ |
| $-\frac{1}{\sqrt{1-x^2}}$ | $\arccos(x)$ |
| $\frac{1}{1+x^2}$ | $\arctan(x)$ |