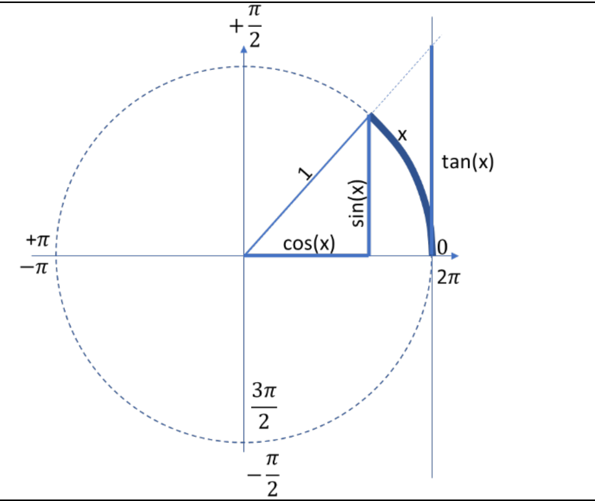
MVE535 Tentamen formelblad

$\sin^2 x + \cos^2 x = 1$	$\cosh^2 x - \sinh^2 x = 1$
$\sin(a \pm b) = \sin a \cos b \pm \cos a \sin b$ $\sinh(a \pm b) = \sinh a \cosh b$ $\pm \cosh a \sinh b$	$(f \pm g)' = f' \pm g'$
$\cos(a \pm b) = \cos a \cos b \mp \sin a \sin b$ $\cosh(a \pm b) = \cosh a \cosh b$ $\pm \sinh a \sinh b$	$(fg)' = f'g + fg'$
$(\sin x)' = \cos x$ $(\sinh x)' = \cosh x$	$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$
$(\cos x)' = -\sin x$ $(\cosh x)' = \sinh x$	$(\ln\lvert x\rvert)' = \frac{1}{x}$
$(x^\alpha)' = \alpha x^{\alpha-1}$	$(e^x)' = e^x$
$\tan x = \frac{\sin x}{\cos x}$	$\cot x = \frac{\cos x}{\sin x}$
$\sinh x = \frac{1}{2}(e^x - e^{-x})$	$\cosh x = \frac{1}{2}(e^x + e^{-x})$
$\tanh x = \frac{\sinh x}{\cosh x}$	$\coth x = \frac{\cosh x}{\sinh x}$
$\int_a^b f(x)dx = F(x)\Big\rvert_a^b$	$\int \sin x\, dx = -\cos x + c$
$\int f'(x)dx = f(x) + c, \int df = f + c$	$\int \cos x\, dx = \sin x + c$
$\int fg dx = Fg - \int Fg' dx$ med $F' = f$	$\lim \frac{f}{g} = \lim \frac{f'}{g'}$ om $\frac{0}{0}$ eller $\frac{\infty}{\infty}$
$f^{-1}(x) = y \Leftrightarrow f(y) = x$	$[f(g(x))]' = f'(g(x))g'(x)$ $\frac{df}{dx} = \frac{df}{du}\frac{du}{dx}$
$e^{ix} = \cos x + i \sin x$	
$d(f(x)) = f'(x)dx$ $df = f'dx$	$d(f(x)) \overset{\text{def}}{=} f(x + dx) - f(x)$
$\Delta f \approx f'(x)\Delta x, f(a+h) \approx f(a) + f'(a)h$	
$f(x) \approx kx + m$ när $x \to \infty \Leftrightarrow \lim_{x\to\infty}[f(x) - (kx+m)] = 0$	
$f(x) \approx kx + m$ när $x \to \infty \Leftrightarrow k = \lim_{x\to\infty} \frac{f(x)}{x}, m = \lim_{x\to\infty}[f(x) - kx]$	
$dx = (\Delta x, \Delta x \to 0)$	$df = \frac{df}{dx}dx$
$\operatorname{Arg}(re^{iu}) = u$ $\lvert z\rvert^2 = zz^* = r^2$	$z = x + iy$ $z^* = x - iy$
$(a^x)^y = a^{x \cdot y}, a^x a^y = a^{x+y}, a^0 = 1$ $\ln(xy) = \ln x + \ln y$ $\ln(x/y) = \ln x - \ln y$ $\ln a^b = b \ln a$ $\ln 1 = 0$ $\ln e = 1$	$\sin y = x \Leftrightarrow y = \arcsin x$ $\sinh y = x \Leftrightarrow y = \operatorname{arcsinh} x$ $e^y = x \Leftrightarrow y = \ln x$ $y^p = x \Leftrightarrow y = \sqrt[p]{x} = x^{\frac{1}{p}} \quad x \geq 0$



x	$\sin x$	$\cos x$
$0^o \equiv 0$	0	1
$30^o \equiv \frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
$45^o \equiv \frac{\pi}{4}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$
$60^o \equiv \frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
$90^o \equiv \frac{\pi}{2}$	1	0
$180^o \equiv \pi$	0	-1
$360^o \equiv 2\pi$	0	1

MVE545 Tentamen formelblad

Matematisk yta: $A = \int_a^b f(x)dx$	Fysisk yta: $A = \int_a^b \lvert f(x)\rvert dx$
Längd, version 1 $L = \int_a^b \sqrt{x'(t)^2 + y'(t)^2}dt$ $P(t) = (x(t), y(t))$	Längd, version 2 $L = \int_a^b \sqrt{1 + f'(x)^2}dx$ $P(x) = (x, f(x))$
Roterande yta $S = 2\pi \int_a^b f(x)\sqrt{1 + f'(x)^2}dx$	Roterande volym $V = \pi \int_a^b f(x)^2 dx$
DE, linjär, grad1 $y'(x) + g(x)y(x) = h(x)$ $G(x) = \int g(x)\,dx \quad A(x) = \int e^{G(x)}h(x)dx$ $y(x) = A(x)e^{-G(x)}$	DE, separabel, grad 1 $g(y(x))y'(x) = h(x)$ $\int g(y)dy = \int h(x)dx$

DE, linjär, grad2, konstanta koefficienter: $ay''(x) + by'(x) + cy(x) = h(x); y(x) = y_h(x) + y_p(x)$

den homogena ekvationen $ay_h''(x) + by_h'(x) + cy_h(x) = 0$ den karakteristiska ekvationen $a\lambda^2 + b\lambda + c = 0$ lösnings mallar $y_h = Ae^{\lambda_1 x} + Be^{\lambda_2 x}$ om $\lambda_1 \neq \lambda_2 \in R$ $y_h = (A + Bx)e^{\lambda_1 x}$ om $\lambda_1 = \lambda_2 \in R$ $y_h = e^{ux}(A\sin vx + B\cos vx)$ om $\lambda_{1,2} = u \pm iv$	DE, linjär, grad2, konstanta koefficienter den partikulära lösningen $ay_p''(x) + by_p'(x) + cy_p(x) = h(x)$

$h(x)$	$y_p(x)$
$p_n(x)$	$q_n(x)$
$p_n(x)e^{kx}$	$q_n(x)e^{kx}$
$p_n(x)\sin kx$	$q_n(x)\sin kx + \tilde{q}_n(x)\cos kx$
$p_n(x)\cos kx$	$q_n(x)\cos kx + \tilde{q}_n(x)\sin kx$
$h_1 + h_2$	$y_{p1} + y_{p2}$

matematiska analysens huvudsats, version 1 $\frac{d}{dx}\int_a^x f(t)dt = f(x)$	matematiska analysens huvudsats 2, version 2 $\int_a^b f(x)dx = F(b) - F(a) = F(x)\rvert_a^b$ $F'(x) = f(x) \leftrightarrow F(x) = \int f(x)dx$
$(\arcsin x)' = \frac{1}{\sqrt{1 - x^2}}$	$(\arctan x)' = \frac{1}{1 + x^2}$
$(\arccos x)' = -\frac{1}{\sqrt{1 - x^2}}$	$(\text{arccot}\, x)' = -\frac{1}{1 + x^2}$

$$\int \sqrt{x^2 \pm 1}dx = \frac{x}{2}\sqrt{x^2 \pm 1} \pm \frac{1}{2}\ln\left|x + \sqrt{x^2 \pm 1}\right| + c; \quad x^2 > 1 \text{ om } x^2 - 1$$

$$\int \frac{dx}{\sqrt{x^2 \pm 1}} = \ln\left|x + \sqrt{x^2 \pm 1}\right| + c; \quad x^2 > 1 \text{ om } x^2 - 1$$

$$\int \sqrt{1 - x^2}dx = \frac{x}{2}\sqrt{1 - x^2} + \frac{1}{2}\arcsin(x) + c$$