## Algumas fórmulas sobre funções trigonométricas

- $\bullet \ \operatorname{sen}^2 x + \cos^2 x = 1.$
- $\operatorname{tg} x = \frac{\operatorname{sen} x}{\cos x}$ ,  $\operatorname{cotg} x = \frac{\cos x}{\operatorname{sen} x}$ .
- $\sec x = \frac{1}{\cos x}$ ,  $\csc x = \frac{1}{\sin x}$ .
- $\operatorname{sen}(x+y) = \operatorname{sen} x \cos y + \cos x \operatorname{sen} y$ .
- $\operatorname{sen}(x y) = \operatorname{sen} x \cos y \cos x \operatorname{sen} y$ .
- $\operatorname{sen} 2x = 2 \operatorname{sen} x \cos x$ .
- $\cos(x+y) = \cos x \cos y \sin x \sin y$ .
- $\cos(x y) = \cos x \cos y + \sin x \sin y$ .
- $\bullet \cos 2x = \cos^2 x \sin^2 x.$
- $\cos^2 x = \frac{1 + \cos 2x}{2}$ ,  $\sin^2 x = \frac{1 \cos 2x}{2}$ .

	$\pi/6$	$\pi/4$	$\pi/3$
sen	1/2	$\sqrt{2}/2$	$\sqrt{3}/2$
cos	$\sqrt{3}/2$	$\sqrt{2}/2$	1/2

	0	$\pi/2$	$\pi$	$3\pi/2$
sen	0	1	0	-1
$\cos$	1	0	-1	0

- $\operatorname{sen}(-x) = -\operatorname{sen} x$ .
- $\bullet \cos(-x) = \cos x.$
- $\operatorname{sen}(\pi x) = \operatorname{sen} x$ .
- $\bullet \cos(\pi x) = -\cos x.$
- $\operatorname{sen}(\pi + x) = -\operatorname{sen} x$ .
- $\bullet \ \cos(\pi + x) = -\cos x \,.$
- $\operatorname{sen}(\pi/2 x) = \cos x$ .
- $\cos(\pi/2 x) = \sin x$ .
- $\operatorname{sen}(\pi/2 + x) = \cos x$ .
- $\cos(\pi/2 + x) = -\sin x$ .
- $\bullet \ \operatorname{sen}(3\pi/2 x) = -\cos x.$
- $\cos(3\pi/2 x) = -\sin x$ .
- $sen(3\pi/2 + x) = -cos x$ .
- $\bullet \cos 3(\pi/2 + x) = \sin x.$

## Algumas fórmulas sobre funções hiperbólicas

- $\operatorname{ch} x = \frac{e^x + e^{-x}}{2}$ ,  $\operatorname{sh} x = \frac{e^x e^{-x}}{2}$ .
- $\bullet \ \operatorname{ch}^2 x \operatorname{sh}^2 x = 1.$
- $\operatorname{th} x = \frac{\operatorname{sh} x}{\operatorname{ch} x}$ ,  $\operatorname{coth} x = \frac{\operatorname{ch} x}{\operatorname{sh} x}$
- $\operatorname{sech} x = \frac{1}{\operatorname{ch} x}$ ,  $\operatorname{cosech} x = \frac{1}{\operatorname{sh} x}$ .

- $\operatorname{sh}(x+y) = \operatorname{sh} x \operatorname{ch} y + \operatorname{ch} x \operatorname{sh} y$ .
- $\operatorname{sh}(x-y) = \operatorname{sh} x \operatorname{ch} y \operatorname{ch} x \operatorname{sh} y$ .
- $\operatorname{sh} 2x = 2 \operatorname{sh} x \operatorname{ch} x$ .
- $\operatorname{ch}(x+y) = \operatorname{ch} x \operatorname{ch} y + \operatorname{sh} x \operatorname{sh} y$ .
- $\operatorname{ch}(x y) = \operatorname{ch} x \operatorname{ch} y \operatorname{sh} x \operatorname{sh} y$ .
- $\operatorname{ch}^2 x = \frac{\operatorname{ch} 2x + 1}{2}$ ,  $\operatorname{sh}^2 x = \frac{\operatorname{ch} 2x 1}{2}$ .