Instituto Politécnico de Tomar
**Escola Superior de Tecnologia de Tomar**
Área Interdepartamental de Matemática
Análise Matemática I (Engenharias)

## Tabela de Potências e Logaritmos

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|---|---|
| 1. $a^x a^y = a^{x+y}$ | 6. $\forall b \in ]0,+\infty[ \quad a^{\log_a b} = b$ |
| 2. $\dfrac{a^x}{a^y} = a^{x-y}$ | 7. $xy > 0 \Rightarrow \log_a(xy) = \log_a \lvert x\rvert + \log_a \lvert y\rvert$ |
| 3. $a^x b^x = (ab)^x$ | 8. $\frac{x}{y} > 0 \Rightarrow \log_a \frac{x}{y} = \log_a \lvert x\rvert - \log_a \lvert y\rvert$ |
| 4. $\dfrac{a^x}{b^x} = (\dfrac{a}{b})^x$ | 9. $x > 0 \Rightarrow \log_a x^y = y \log_a x$ |
| 5. $(a^x)^y = a^{xy}$ | |

## Tabela de Trigonometria Hiperbólica

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|---|---|---|---|
| $\cosh x \frac{e^x+e^{-x}}{2}$ | $\sinh x = \frac{e^x-e^{-x}}{2}$ | $\tanh x = \frac{\sinh x}{\cosh x} = \frac{e^{2x}-1}{e^{2x}+1}$ | $\coth x = \frac{\cosh x}{\sinh x} = \frac{1}{\tanh x}$ |

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|---|---|
| 1. $\cosh x + \sinh x = e^x$ | 10. $\tanh(x+y) = \frac{\tanh x+\tanh y}{1+\tanh x \tanh y}$ |
| 2. $\cosh x - \sinh x = e^{-x}$ | 11. $\coth(x+y) = \frac{1+\coth x \coth y}{\coth x+\coth y}$ |
| 3. $\cosh^2 x - \sinh^2 x = 1$ | 12. $\cosh 2x = \cosh^2 x + \sinh^2 x$ |
| 4. $1 - \tanh^2 x = \frac{1}{\cosh^2 x}$ | 13. $\sinh 2x = 2 \sinh x \cosh x$ |
| 5. $\coth^2 x - 1 = \frac{1}{\sinh^2 x}$ | 14. $\tanh 2x = \frac{2 \tanh x}{1+\tanh^2 x}$ |
| 6. $\cosh x = \frac{1}{\sqrt{1-\tanh^2 x}}$ | 15. $\coth 2x = \frac{1+\coth^2 x}{2 \coth x}$ |
| 7. $\sinh x = \frac{\tanh x}{\sqrt{1-\tanh^2 x}}$ | 16. $\cosh x \cosh y = \frac{1}{2}(\cosh(x+y) + \cosh(x-y))$ |
| 8. $\cosh(x+y) = \cosh x \cosh y + \sinh x \sinh y$ | 17. $\sinh x \sinh y = \frac{1}{2}(\cosh(x+y) - \cosh(x-y))$ |
| 9. $\sinh(x+y) = \sinh x \cosh y + \cosh x \sinh y$ | 18. $\sinh x \cosh y = \frac{1}{2}(\sinh(x+y) + \sinh(x-y))$ |

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|---|---|
| 19. $\cosh a + \cosh b = 2 \cosh \frac{a+b}{2} \cosh \frac{a-b}{2}$ | **Fórmulas de Moivre** |
| 20. $\cosh a - \cosh b = 2 \sinh \frac{a+b}{2} \sinh \frac{a-b}{2}$ | 23. $\forall m \in \mathbb{R} (\cosh x + \sinh x)^m = \cosh mx + \sinh mx$ |
| 21. $\sinh a + \sinh b = 2 \sinh \frac{a+b}{2} \cosh \frac{a-b}{2}$ | 24. $\forall m \in \mathbb{R} (\cosh x - \sinh x)^m = \cosh mx - \sinh mx$ |
| 22. $\sinh a - \sinh b = 2 \cosh \frac{a+b}{2} \sinh \frac{a-b}{2}$ | |