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**Atividade Avaliativa 03**

| **f(n)** | **g(n)** |
|---|---|
| n - 100 | n - 200 |
| log n | $(log\ n)^2$ |
| log n | $log\ n^2$ |
| $2^n$ | $2^{n+1}$ |
| n! | $2^n$ |
| $2n^2 + 5n$ | $n^2$ |
| $2n^2 + 5n$ | $n^3$ |

**f(n) = n - 100 e g(n) = n - 200**

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = \frac{n-100}{n-200} = \frac{\infty}{\infty}$$

$$\lim_{n\to\infty} \frac{(1-\frac{100}{n})}{(1-\frac{200}{n})} = 1$$

f(n) = O(g(n)) e f(n) = Ω(g(n))

**f(n) = Θ(g(n)), f(n) ≠ o(g(n)) e f(n) ≠ ω(g(n)).**

**f(n) = log n e g(n) =** $(log\ n)^2$

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = \frac{log\ n}{(log\ n)^2} = \frac{1}{log\ n} = 0$$

**f(n)** ≠ **ω(g(n))** e **f(n)** = **o(g(n))**

**f(n) = O(g(n)), f(n) ≠ Θ(g(n)) e f(n) ≠ Ω(g(n)).**

**f(n) = log n e g(n) =** $log\ n^2$

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = \frac{log\ n}{log\ n^2} = \frac{log\ n}{2log\ n} = \frac{1}{2}$$

f(n) = O(g(n)) e f(n) = Ω(g(n))

**f(n) = Θ(g(n)), f(n) ≠ o(g(n)) e f(n) ≠ ω(g(n)).**

**f(n) =** $2^n$ **e g(n) =** $2^{n+1}$

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = \frac{2^n}{2^{n+1}} = \frac{2^n}{2^n * 2} = \frac{1}{2}$$

f(n) = O(g(n)) e f(n) = Ω(g(n))

**f(n) = Θ(g(n)), f(n) ≠ o(g(n)) e f(n) ≠ ω(g(n)).**

**f(n) = n! e g(n) =** $2^n$

$$\lim_{n\to\infty} \frac{f(n)}{g(n)} = \frac{n!}{2^n} = \frac{n^n}{2^n} = (\frac{n}{2})^n = \infty$$

f(n) = **ω(g(n))** e **f(n)** ≠ **o(g(n))**

**f(n) ≠ O(g(n)), f(n) ≠ Θ(g(n)) e f(n) = Ω(g(n)).**

**f(n) =** $2n^2 + 5n$ **e g(n) =** $n^2$

$$\lim_{n \to \infty} \frac{f(n)}{g(n)} = \frac{2n^2 + 5n}{n^2} = \frac{n(2n+5)}{n^2} = \frac{2n+5}{n} = 2 + \frac{5}{n} = 2 + 0 = 2$$

f(n) = O(g(n) e f(n) = $\mathbf{\Omega(g(n))}$

**f(n) = Θ(g(n)), f(n) ≠ o(g(n)) e f(n) ≠ ω(g(n)).**

**f(n) =** $2n^2 + 5n$ **e g(n) =** $n^3$

$$\lim_{n \to \infty} \frac{f(n)}{g(n)} = \frac{2n^2 + 5n}{n^3} = \frac{n(2n+5)}{n^3} = \frac{2n+5}{n^2} = \frac{2}{n} + \frac{5}{n^2} = 0 + 0 = 0$$

f(n) ≠ $\mathbf{\omega(g(n))}$ e f(n) = o(g(n))

**f(n) = O(g(n)), f(n) ≠ Θ(g(n)) e f(n) ≠ Ω(g(n)).**