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S	T	O	O	S	S	D
M	T	W	T	F	S	S

① a) $f(m) = m$

$$m = O(m)$$

$$\frac{1 \cdot m}{m} \leq \frac{C \cdot m}{m} \rightarrow 1 \leq C$$

$$C = 1$$

b) $f(m) = 1045m$

$$1045m = O(m)$$

$$\frac{1045m}{m} \leq \frac{C \cdot m}{m} \rightarrow 1045 \leq C$$

$$C = 1045$$

c) $f(m) = m^2 + 70$

$$\frac{m^2 + 70}{m} \leq \frac{C \cdot m}{m} \rightarrow m + \frac{70}{m} \leq C \rightarrow \text{?}$$

$$m = 2$$

$$2 + 35 \leq C$$

$$37 \leq C$$

d) $f(m) = 7m + 3$

$$\frac{7m + 3}{m} \leq \frac{C \cdot m}{m} \rightarrow 7 + \frac{3}{m} \rightarrow 10 \leq C$$

$$m = 2$$

$$7 + 1,5 \leq C$$

$$8,5 \leq C$$

e) $f(m) = Cm + D$, onde C, D são constantes

$$Cm + D = O(m)$$

$$m = 1 \rightarrow C + D \leq C$$

$$\frac{Cm + D}{m} \leq \frac{C \cdot m}{m} \rightarrow C + \frac{D}{m} \leq C$$

$$m = 2 \rightarrow C + \frac{D}{2} \leq C$$

$$\frac{D}{m} \leq 0 \rightarrow D \leq 0$$

f) $f(m) = 8$

$$m = 1 \rightarrow 8 \leq C$$

$$\frac{8}{m} \leq \frac{C \cdot m}{m} \rightarrow 8 \leq C$$

$$m = 2 \rightarrow \frac{8}{2} = 4 \leq C$$

g) $f(m) = m^3 + m + 1$

$$\frac{m^3}{m} + \frac{m}{m} + \frac{1}{m} \leq \frac{C \cdot m}{m} \rightarrow m^2 + 1 \leq C \rightarrow 2 \leq C \quad \checkmark$$

h) $f(m) = 4m + 2 \log m + 5$

$$4m + 2 \log m + 5 = O(m) \quad \sim \checkmark$$

$$\frac{4m}{m} + \frac{2 \log m}{m} + \frac{5}{m} \rightarrow 4 + 2 \log 1 + \frac{5}{m} \leq C \rightarrow 9 \leq C$$

② a) $f(m) = 3m^3 + m$

$$\frac{C_1 m^3}{m^3} \leq \frac{3m^3}{m^3} + \frac{m}{m^3} \leq \frac{C_2 m^3}{m^3}$$

$$C_1 \leq 3 + \frac{1}{m^2} \leq C_2 \quad m=2 \rightarrow C_1 = 11 \quad C_2 = 13$$

b) $f(m) = 3 \log m + 5m$

$$\frac{C_1 m}{m} \leq \frac{3 \log m}{m} + \frac{5m}{m} \leq \frac{C_2 m}{m}$$

$$C_1 \leq 3 \log 1 + 5 \leq C_2 \quad C_1 = 4,99$$

$$C_1 \leq 0 + 5 \leq C_2 \quad C_2 = 5,01$$

c) $f(m) = 3m^2 + 5m + 4$

$$\frac{C_1 m^2}{m^2} \leq \frac{3m^2}{m^2} + \frac{5m}{m^2} + \frac{4}{m^2} \leq \frac{C_2 m^2}{m^2}$$

$$C_1 \leq 3 + \frac{5}{m} + \frac{4}{m^2} \leq C_2$$

$$m=2 \rightarrow 3 + 2,5 + 1$$

$$C_1 = 6,4$$

$$C_2 = 6,6$$

d) $f(m) = 3m^3 + m^2 + 5m + 99$

$$\frac{C_1 n^3}{n^3} \leq \frac{3n^3}{n^3} + \frac{n^2}{n^3} + \frac{5n}{n^3} + \frac{99}{n^3} \leq \frac{C_2 n^3}{n^3}$$

$$C_1 \leq 3 + \frac{1}{n} + \frac{5}{n^2} + \frac{99}{n^3} \leq C_2 \quad m=1 \rightarrow C_1 \leq 107,99$$

$$C_2 \geq 108,01$$

③ a) Comparação Atribuições

PIOR →	$m-2$	$m-1$
MELHOR →	$m-2$	1
MÉDIO →	$m-2$	$m/2$

b) Comparação Atribuições

PIOR →	m^2	$3m^2$
MELHOR →	m^2	0
MÉDIO →	m^2	$3m^2/2$

c) Comparação Atribuições

PIOR →	$m-10 + K-10$	$1+2m+K$
MELHOR →	$m-10$	1
MÉDIO →	$m-10 + K - \frac{10}{2}$	$m+K + \frac{1}{2}$

④ a) $f(m) = O(m^2) \rightarrow$ Complexidade quadrática
(2 "enquanto")

b) $f(m) = O(m^3) \rightarrow$ Complexidade cúbica
(3 "enquanto")