

Subject: Recitation 13

Year:

Month:

Date:

1

- $\Theta(n)$, $O(n)$, $\Omega(n)$

- $\mathcal{O}(n)$, $\mathcal{O}(n)$

- $\Omega(\log^{300} n)$, $\omega(\log^{300} n)$

- $\Omega(n)$, $\omega(n)$

- $O(1.01^n)$, $\mathcal{O}(1.01^n)$

2

$$1. \lim \frac{2f}{2g} = \lim \frac{f}{g} = 1 \checkmark$$

$$2. \lim \frac{f^2}{g^2} = \lim \frac{f}{g} \cdot \frac{f}{g} = \lim \frac{f}{g} \cdot \lim \frac{f}{g} = 1 \checkmark$$

$$3. f = n \quad g = 2n$$

$$4. \text{Ref: } \frac{f}{f} = \frac{f}{f} \checkmark$$

$$\text{tran: } \frac{f}{g} = \frac{f}{gh}, \frac{g}{h} = 1 \rightarrow \frac{f}{h} = 1$$

$$\text{sym: } \frac{f}{g} = 1 = \frac{g}{f}$$

$$5. \text{Ref: } \frac{f}{F} = \frac{f}{f} \checkmark$$

$$\text{tran: } \frac{f}{g} = c, \frac{g}{h} = c' \rightarrow g = \frac{f}{c}, g = \frac{c'}{h} h$$

$$\rightarrow \frac{f}{c} = c'h \rightarrow \frac{f}{h} = c'c \checkmark$$

$$\text{sym: } \frac{f}{g} = c \rightarrow \frac{g}{f} = \frac{1}{c}$$

3-

$$1. \lim_{h \rightarrow \infty} \frac{a_h}{1}^{b_{1h}} = \lim_{h \rightarrow \infty} a^{\log_2^{(n+1)} b_{1h}} = 1$$

$$\begin{aligned} 2. \lim & \left((2\pi h)^{1/2} \left(\frac{n}{e}\right)^n \right)^{1/h} \\ &= \lim \left((2\pi n)^{1/2n} \frac{n}{e} \right) \\ &= \frac{n}{e} = \Theta(n) \end{aligned}$$