

a)

$$T_1 \stackrel{?}{=} T_2$$

$$\text{exp}(\text{list}(\text{double}, \text{int}, \text{float}), \alpha) \stackrel{?}{=} \text{exp}(\text{list}(\beta, \gamma), \text{list}(\text{int}))$$

$$\{\underbrace{\text{list}(\text{double}, \text{int}, \text{float})}_3 \stackrel{?}{=} \underbrace{\text{list}(\beta, \gamma)}_2, \alpha \stackrel{?}{=} \text{list}(\text{int})\}$$

② → Fail. No unification possible

$$f(s_1 \dots s_n) \stackrel{?}{=} g(t_1 \dots t_m), n \neq m \Rightarrow \text{fail}$$

b)

$$T_3 \stackrel{?}{=} T_4$$

$$\text{median}(\alpha, \text{list}(\alpha), \text{max}(\beta, \text{int})) \stackrel{?}{=} \text{median}(\text{int}, \text{list}(\text{int}), \text{max}(\text{float}, \delta))$$

$$\{\alpha \stackrel{?}{=} \text{int}, \text{list}(\alpha) \stackrel{?}{=} \text{list}(\text{int}), \text{max}(\beta, \text{int}) \stackrel{?}{=} \text{max}(\text{float}, \delta)\}$$

$$\{\alpha \stackrel{?}{=} \text{int}, \alpha \stackrel{?}{=} \text{int}, \beta \stackrel{?}{=} \text{float}, \text{int} \stackrel{?}{=} \delta\}$$

$$\textcircled{4} \rightarrow \{\alpha \stackrel{?}{=} \text{int}, \beta \stackrel{?}{=} \text{float}, \delta \stackrel{?}{=} \text{int}\}$$

$$\theta = \{\alpha \rightarrow \text{int}, \beta \rightarrow \text{float}, \delta \rightarrow \text{int}\}$$

c)

$$T_5 \stackrel{?}{=} T_6$$

$$\text{func}(\beta, \gamma, \text{int}) \stackrel{?}{=} \text{func}(\alpha, \text{list}(\gamma), \text{int})$$

$$\{\beta \stackrel{?}{=} \alpha, \gamma \stackrel{?}{=} \text{list}(\gamma), \text{int} \stackrel{?}{=} \text{int}\}$$

$$\textcircled{3} \rightarrow \{\beta \stackrel{?}{=} \alpha, \gamma \stackrel{?}{=} \text{list}(\gamma)\}$$

$$\textcircled{6} \rightarrow \text{Fail. No unification possible } (\gamma \stackrel{?}{=} \text{list}(\gamma))$$