

1a)

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

$$\stackrel{1}{\Rightarrow} \{ \text{list}(\text{double}, \text{int}, \text{float}) \stackrel{?}{=} \text{list}(\beta, \gamma), \alpha \stackrel{?}{=} \text{list}(\text{int}) \}$$

$$\stackrel{2}{\Rightarrow} \text{fail (no unification)}$$

b)

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

$$\stackrel{1}{\Rightarrow} \{ \alpha \stackrel{?}{=} \text{int}, \text{list}(\alpha) \stackrel{?}{=} \text{list}(\text{int}), \text{max}(\beta, \text{int}) \stackrel{?}{=} \text{max}(\text{float}, \delta) \}$$

$$\stackrel{2}{\Rightarrow} \{ \text{list}(\alpha) \stackrel{?}{=} \text{list}(\text{int}), \text{max}(\beta, \text{int}) \stackrel{?}{=} \text{max}(\text{float}, \delta) \}$$

$$\stackrel{3}{\Rightarrow} \{ \alpha \stackrel{?}{=} \text{int}, \text{max}(\beta, \text{int}) \stackrel{?}{=} \text{max}(\text{float}, \delta) \}$$

$$\stackrel{4}{\Rightarrow} \{ \text{max}(\beta, \text{int}) \stackrel{?}{=} \text{max}(\text{float}, \delta) \}$$

$$\stackrel{5}{\Rightarrow} \{ \beta \stackrel{?}{=} \text{float}, \text{int} \stackrel{?}{=} \delta \}$$

$$\stackrel{6}{\Rightarrow} \{ \text{int} \stackrel{?}{=} \delta \}$$

$$\stackrel{7}{\Rightarrow} \{ \delta \stackrel{?}{=} \text{int} \}$$

$$\stackrel{8}{\Rightarrow} \{ \}$$

$$\text{Output: } \Theta = \{ \alpha \rightarrow \text{int}, \beta \rightarrow \text{float}, \delta \rightarrow \text{int} \}$$

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

$$\stackrel{1}{\Rightarrow} \{ \beta \stackrel{?}{=} \alpha, \gamma \stackrel{?}{=} \text{list}(\gamma, \text{int} \stackrel{?}{=} \text{int}) \}$$

$$\stackrel{2}{\Rightarrow} \{ \gamma \stackrel{?}{=} \text{list}(\gamma), \text{int} \stackrel{?}{=} \text{int} \}$$

$$\stackrel{3}{\Rightarrow} \text{fail (no unification)}$$