

① Let

$$f :: \text{Maybe } a \rightarrow \text{Either } () a$$

$$f \text{ Nothing} = \text{Left } ()$$

$$f (\text{Just } x) = \text{Right } x$$

and

$$g :: \text{Either } () a \rightarrow \text{Maybe } a$$

$$g (\text{Left } x) = \text{Nothing}$$

$$g (\text{Right } x) = \text{Just } x$$

then clearly  $g \circ f = \text{id}$  and  $f \circ g = \text{id}$  so we are done.

⑤

Recall that  $a \times a = \text{Either } a a$  and  $a \times a \cong \text{~~(a, a)~~$

Let then

$$f :: \text{Either } a a \rightarrow (\text{bool}, a)$$

$$f (\text{Left } x) = (\text{True}, x)$$

$$f (\text{Right } x) = (\text{False}, x)$$

and

$$g :: (\text{bool}, a) \rightarrow \text{Either } a a$$

$$g (\text{True}, x) = \text{Left } x$$

$$g (\text{False}, x) = \text{Right } x$$

again,  $g \circ f = \text{id}$ ,  $f \circ g = \text{id}$ .