

What is the problem with this proof?

Hint: Carefully check the justification for each line...
Is there a justification that is not valid?

Let $x = y$

$$x = y$$

Given

$$x \cdot x = y \cdot x$$

Mult POE

$$x^2 = xy$$

Simplify

$$x^2 - y^2 = xy - y^2$$

Subt POE

$$(x + y)(x - y) = y(x - y)$$

Dist Prop

$$\frac{(x + y)(x - y)}{(x - y)} = \frac{y(x - y)}{(x - y)}$$

Div POE

$$(x + y) = y$$

Simplify (cancel)

$$y + y = y$$

Subst POE (since $x = y$)

$$2y = y$$

Simplify

$$\frac{2y}{y} = \frac{y}{y}$$

Div POE

$$2 = 1$$

Simplify (cancel)