$$x = \frac{y}{y} - \frac{1}{y} \quad \longleftrightarrow \quad x = 1 - \frac{1}{y} \quad \longleftrightarrow \quad -x = -1 + \frac{1}{y} \quad \longleftrightarrow \quad 1 - x = \frac{1}{y}$$

**Start**

$$x = \frac{y-1}{y} \quad \longleftrightarrow \quad xy = y - 1 \quad \longleftrightarrow \quad -xy = -y + 1 \quad \longleftrightarrow \quad y - xy = 1 \quad \longleftrightarrow \quad y(1-x) = 1 \quad \longleftrightarrow \quad y = \frac{1}{1-x}$$

**Finish**

$$1 = \frac{y-1}{xy}$$

$$-xy = -\frac{xy}{x} + \frac{xy}{xy} \quad \longleftrightarrow \quad -1 = -\frac{1}{x} + \frac{1}{xy}$$

$$-x + 1 = \frac{1}{y}$$

$$\frac{x}{-x+1} = xy$$

$$1 = \frac{y}{xy} - \frac{1}{xy} \quad \longleftrightarrow \quad 1 = \frac{1}{x} - \frac{1}{xy}$$

$$-1 + \frac{1}{x} = \frac{1}{xy} \quad \longleftrightarrow \quad \frac{1}{-1 + \frac{1}{x}} = xy$$

$\longleftrightarrow$ add same value to both sides

$\longleftrightarrow$ multiply both sides by same value

$\longleftrightarrow$ take reciprocal of both sides

$\longleftrightarrow$ distribute / factor

$\longleftrightarrow$ multiply by 1 / simplify to 1