

Under the rescaling $x \rightarrow x/s$, $y \rightarrow y/s^{1/2}$, and $\tau \rightarrow \tau/s^z$, we find invariance provided

$$\begin{aligned}\phi &\rightarrow \phi s \\ \psi &\rightarrow \psi s^{(2z+1)/4} \\ g &\rightarrow g s^{(3-2z)/4}\end{aligned}$$

So the action is invariant provided $z = 3/2$.