(f) $\sigma(w) = w^R$ No

$x = a_1 a_2$

$\sigma(x) = a_2 a_1$

$\sigma(xy) = b_2 b_1 a_2 a_1$

$y = b_1 b_2$

$\sigma(y) = b_2 b_1$

$$\sigma(x)\sigma(y) = a_2 a_1 b_2 b_1$$

Contrexemple

$x = ab$

$\sigma(x)\sigma(y) = x^R y^R = ba\,ab$

$y = ba$

$\sigma(xy) = abba^R = abba$