first and and second principal components of  $ec{v_1}$ 

$$ec{v_1} = (3.38, 2.07)$$
 $proj_2 \vec{v_1} = \|\vec{v_1}\|^2 = \|proj_1 \vec{v_1}\|^2 + \|proj_2 \vec{v_1}\|^2 = (-0.10, 0.18) \ 3.47^2 + 1.89^2 + -0.10^2 + 0.18^2$