We know that the equation of a line is $y - y_1 = m(x - x_1)$, where m is the slope (in this case it is -1), and (x_1, y_1) is a point. (in this case it is (1,1))

Therefore y-1 = -1(x-1)

y = -x+1+1

y = -x+2

Therefore the equation of the line tangent to the curve at (1,1)
is y = -x+2, QED