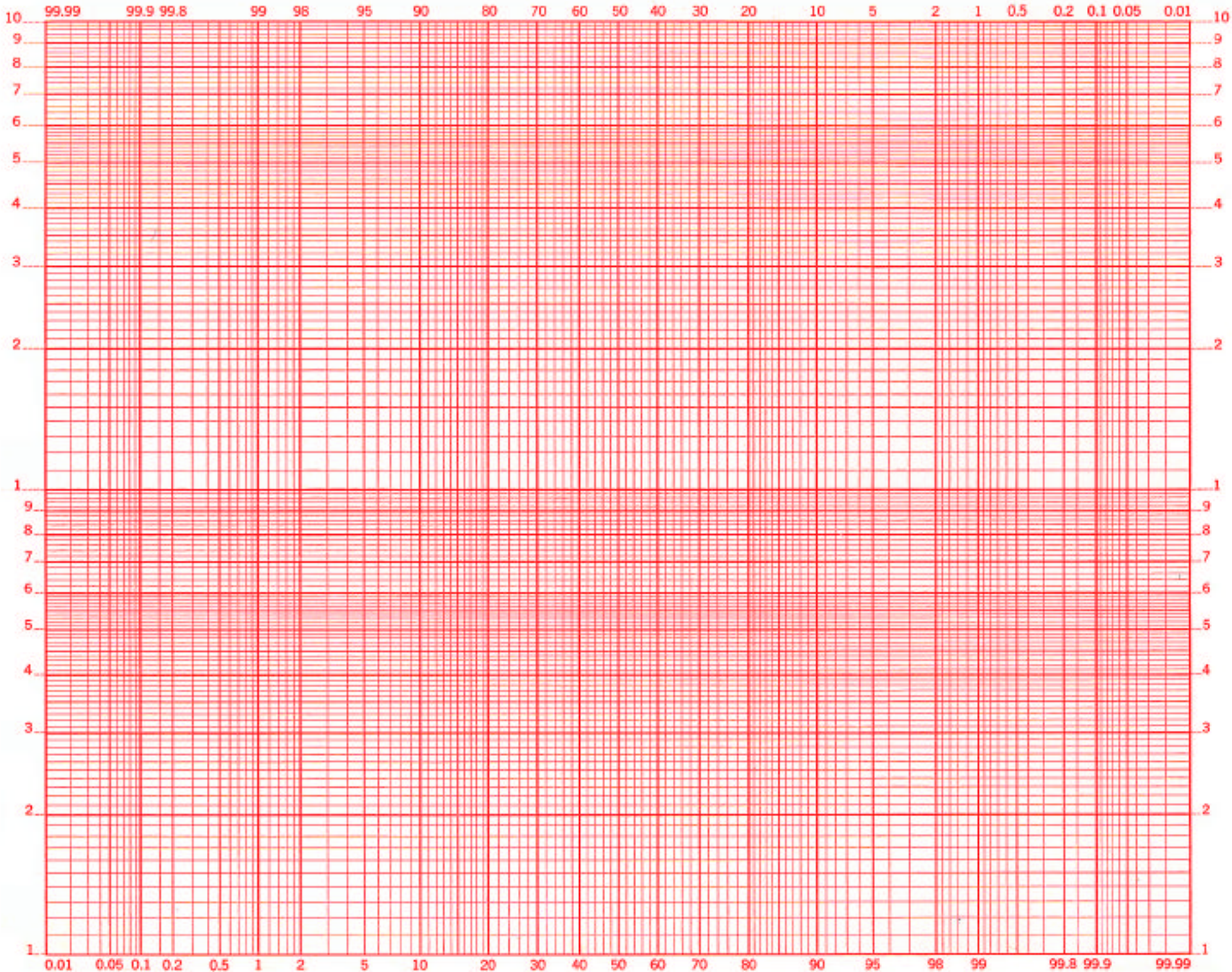probability x 2 log cycles