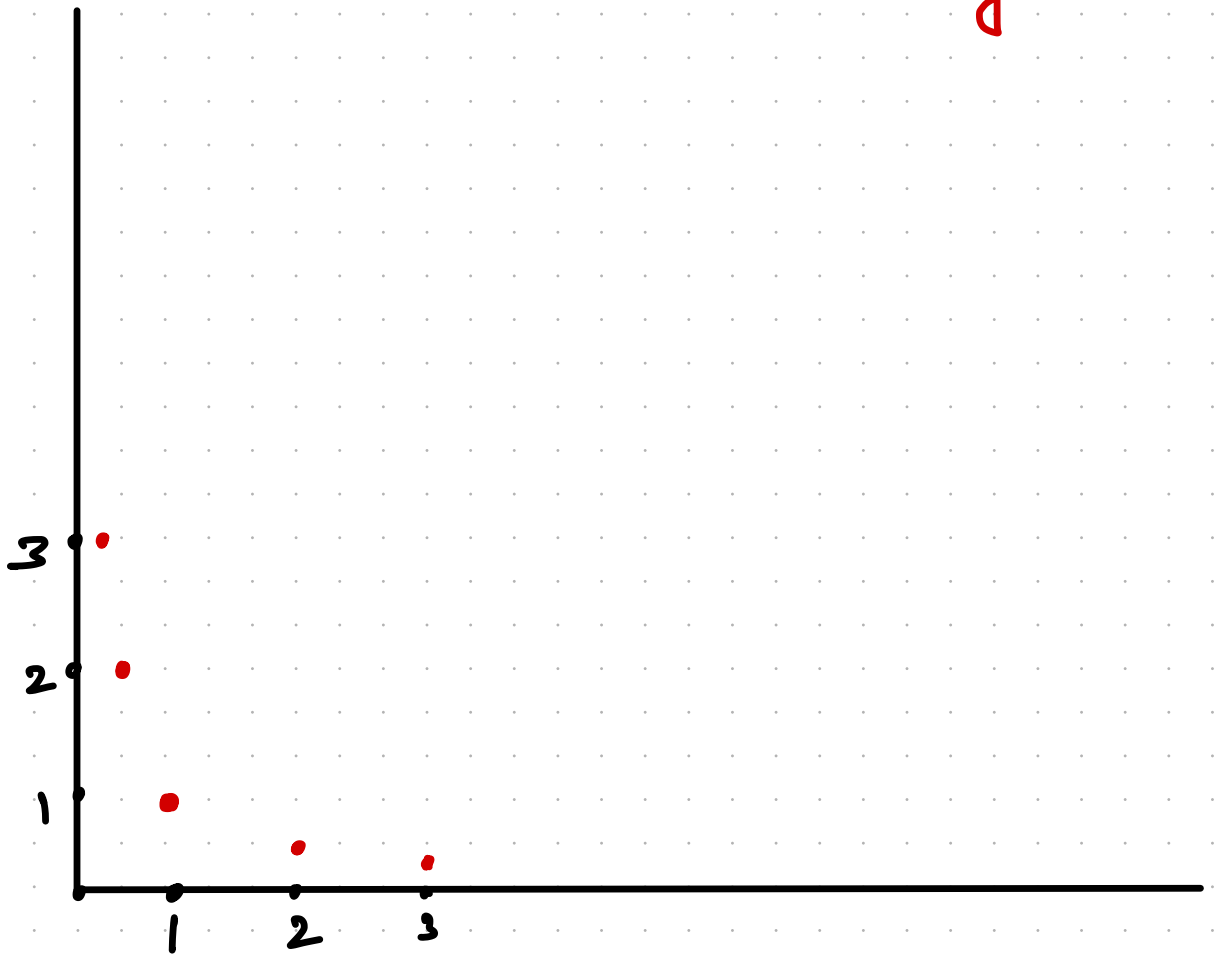
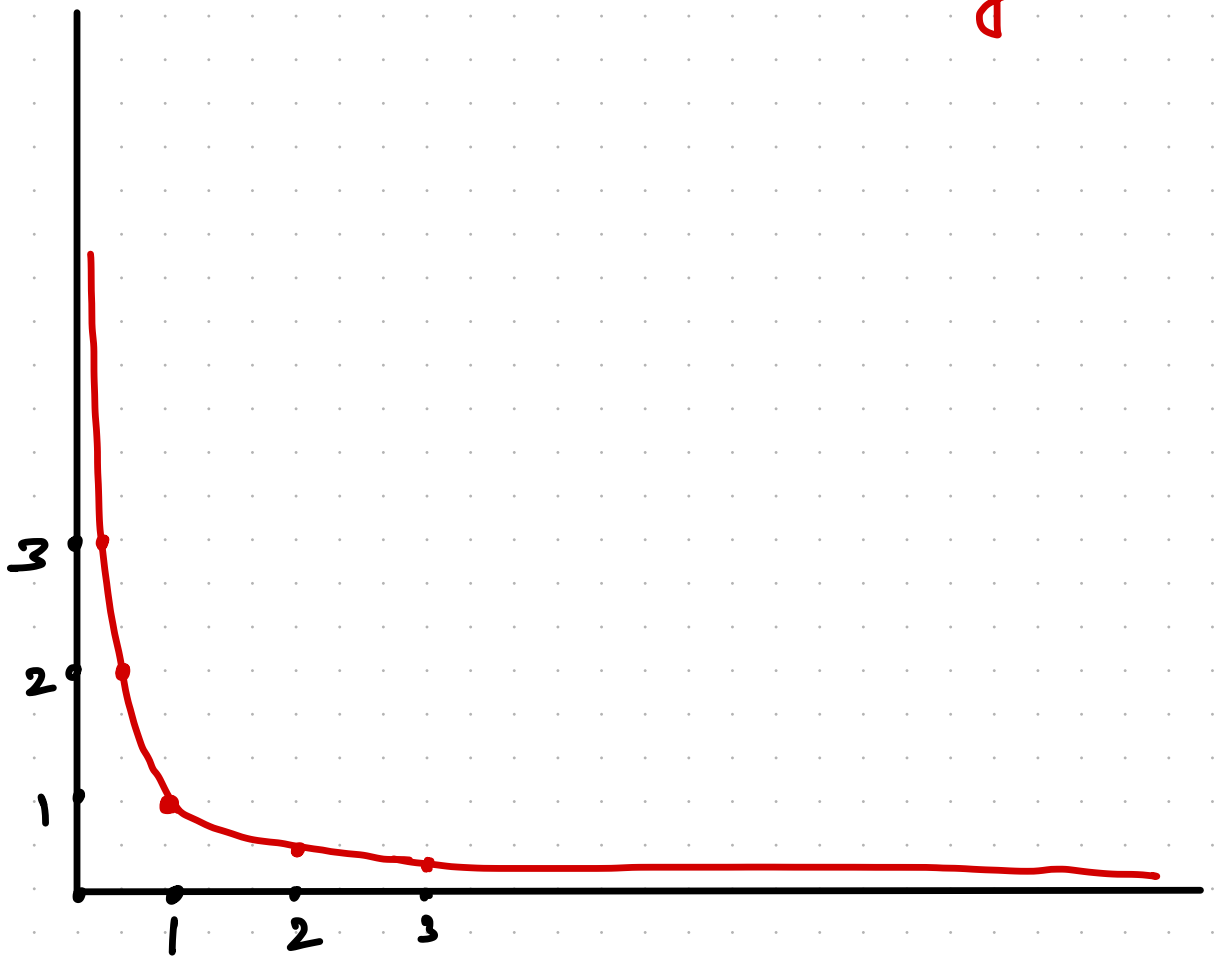
(DRAWN ONLY IN FIRST QUADRANT)

$xy = 1$

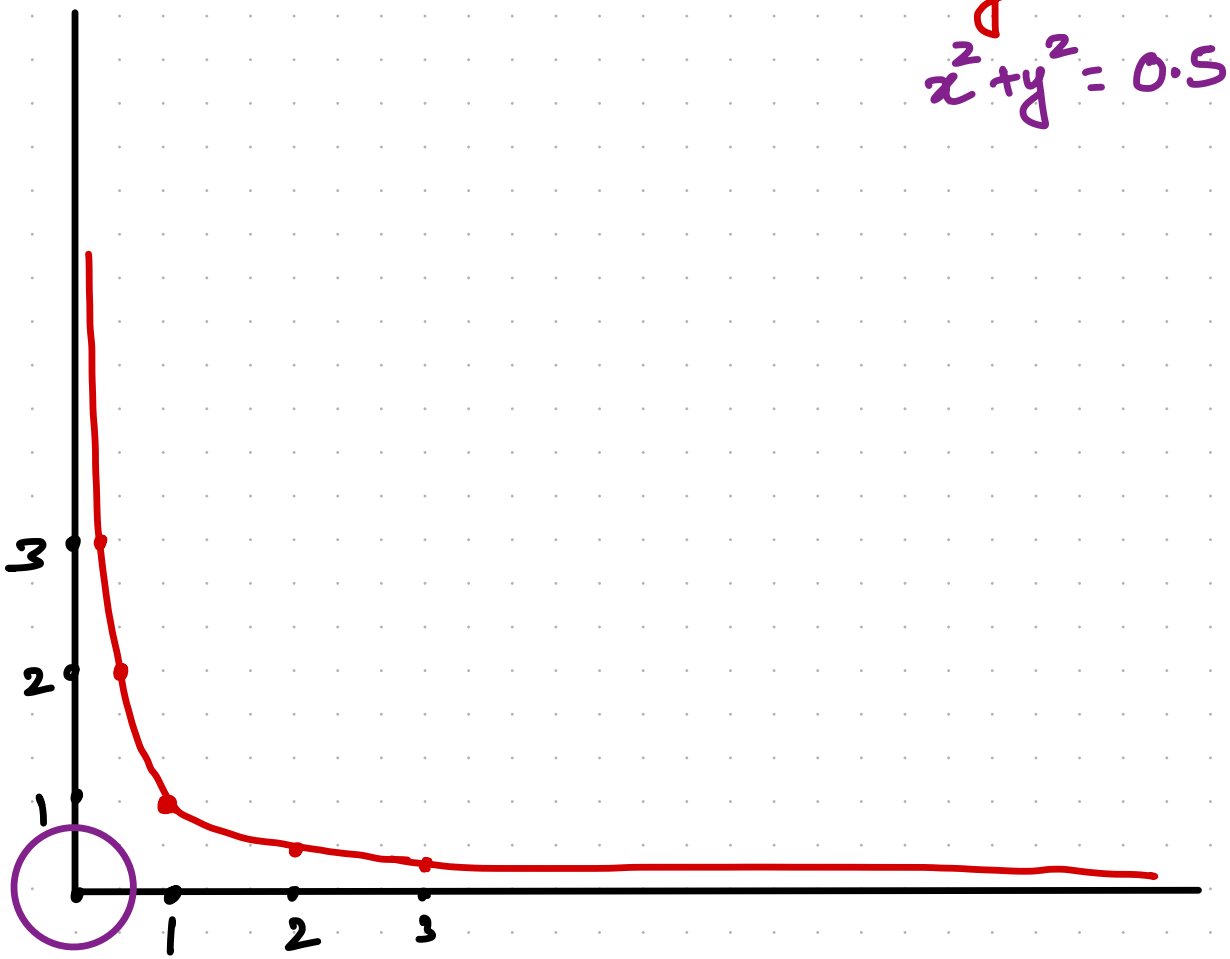


$xy = 1$



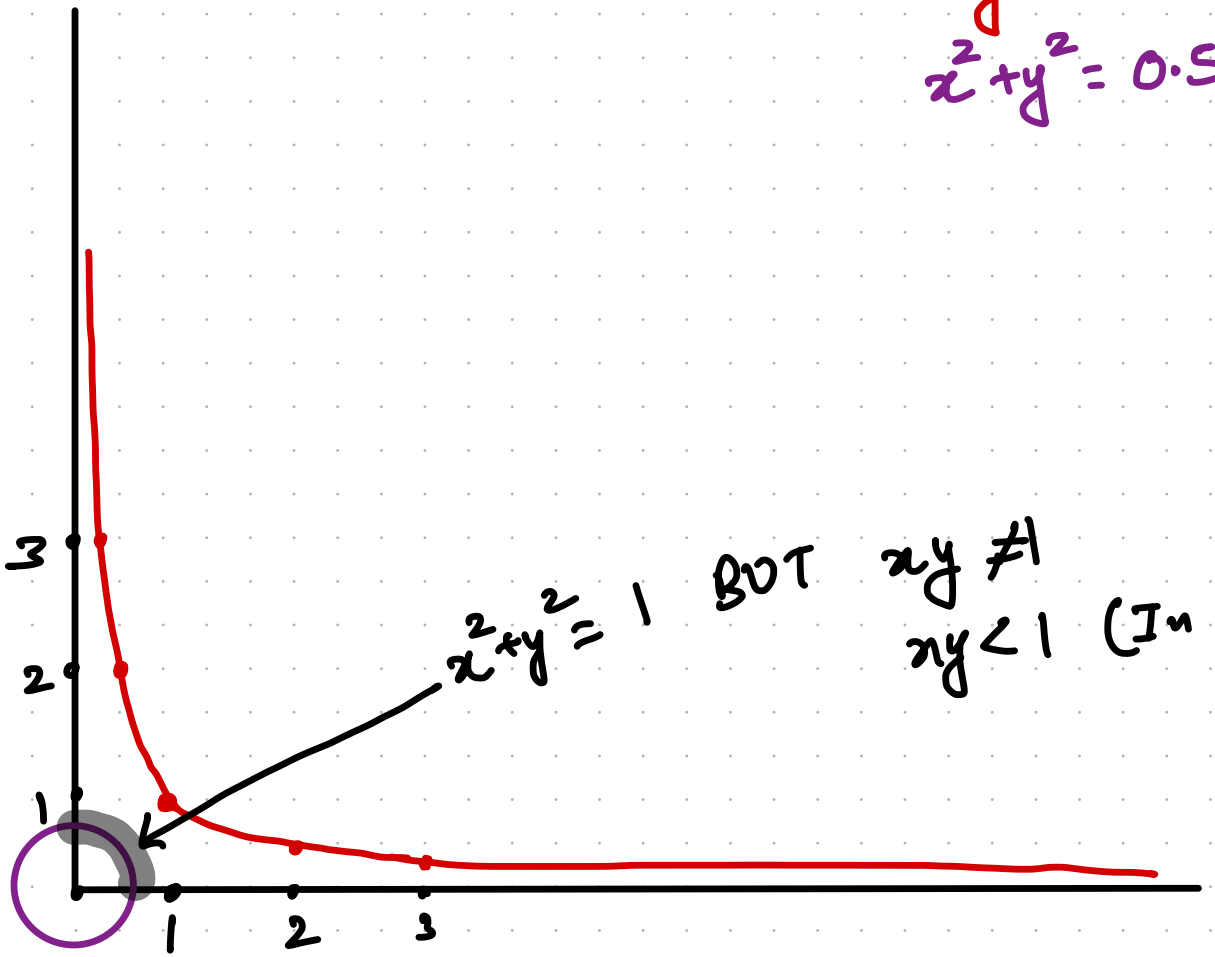
$xy = 1$

$x^2 + y^2 = 0.5$



$xy = 1$

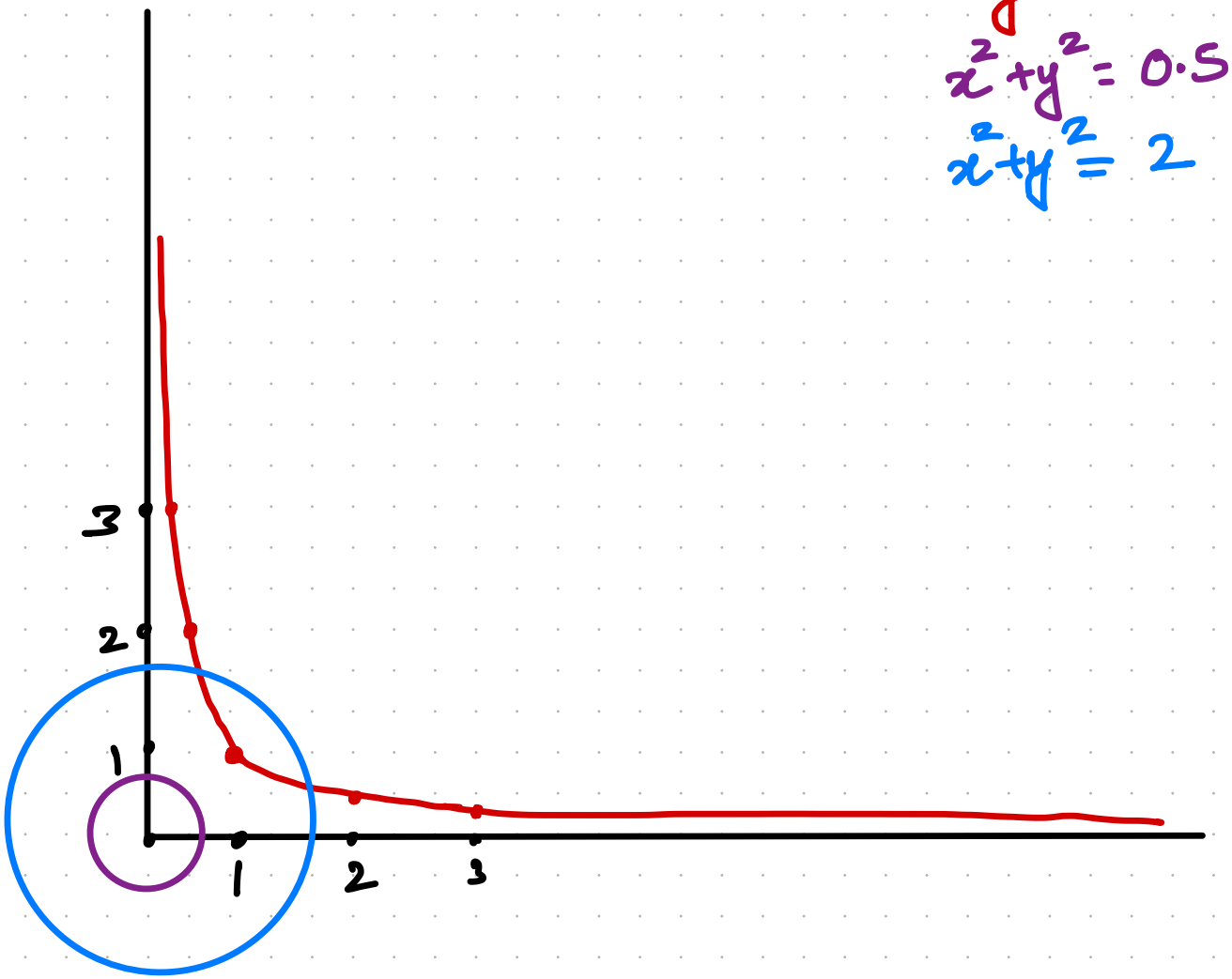
$x^2 + y^2 = 0.5$



$xy = 1$

$x^2 + y^2 = 0.5$

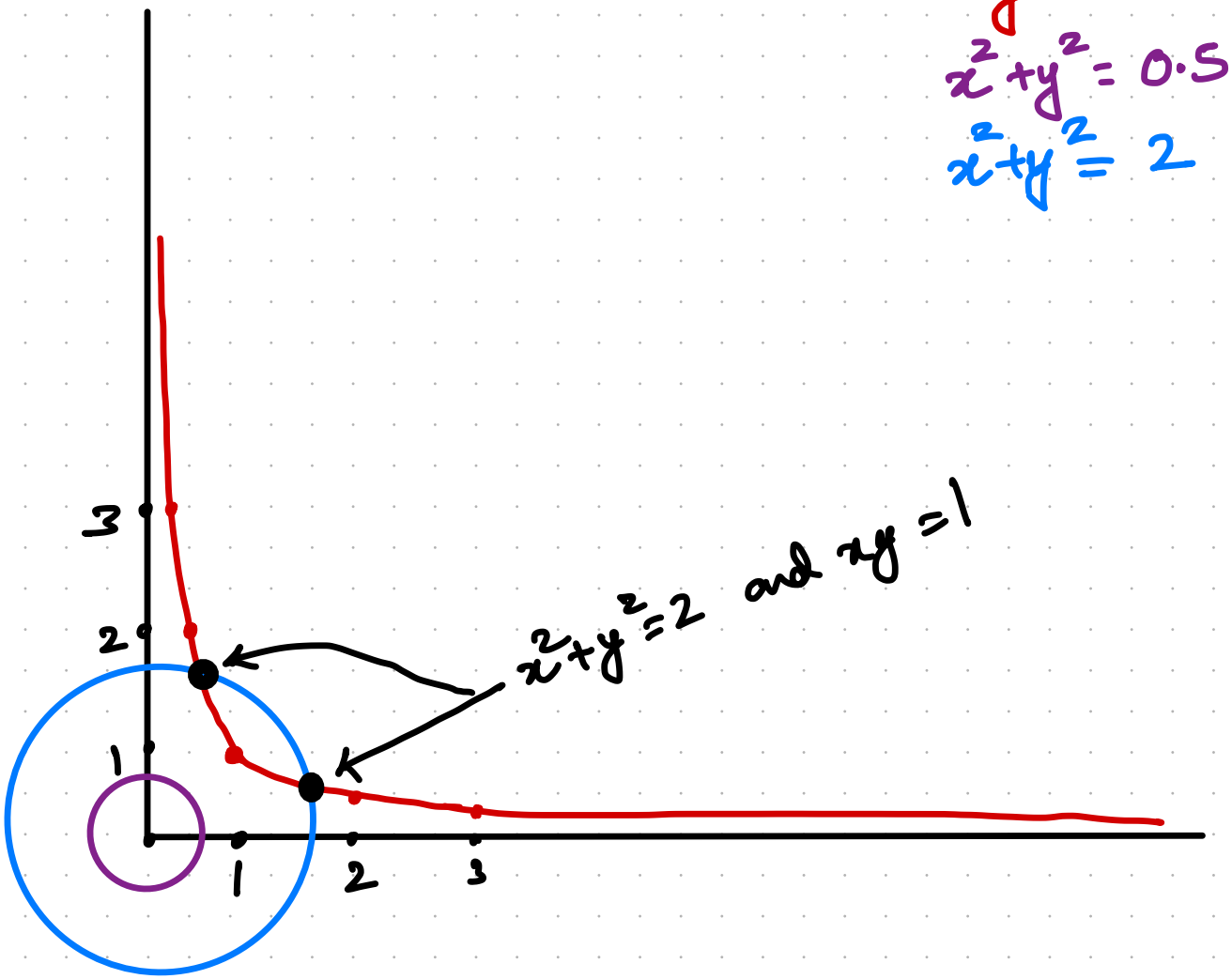
$x^2 + y^2 = 2$



$xy = 1$

$x^2 + y^2 = 0.5$

$x^2 + y^2 = 2$

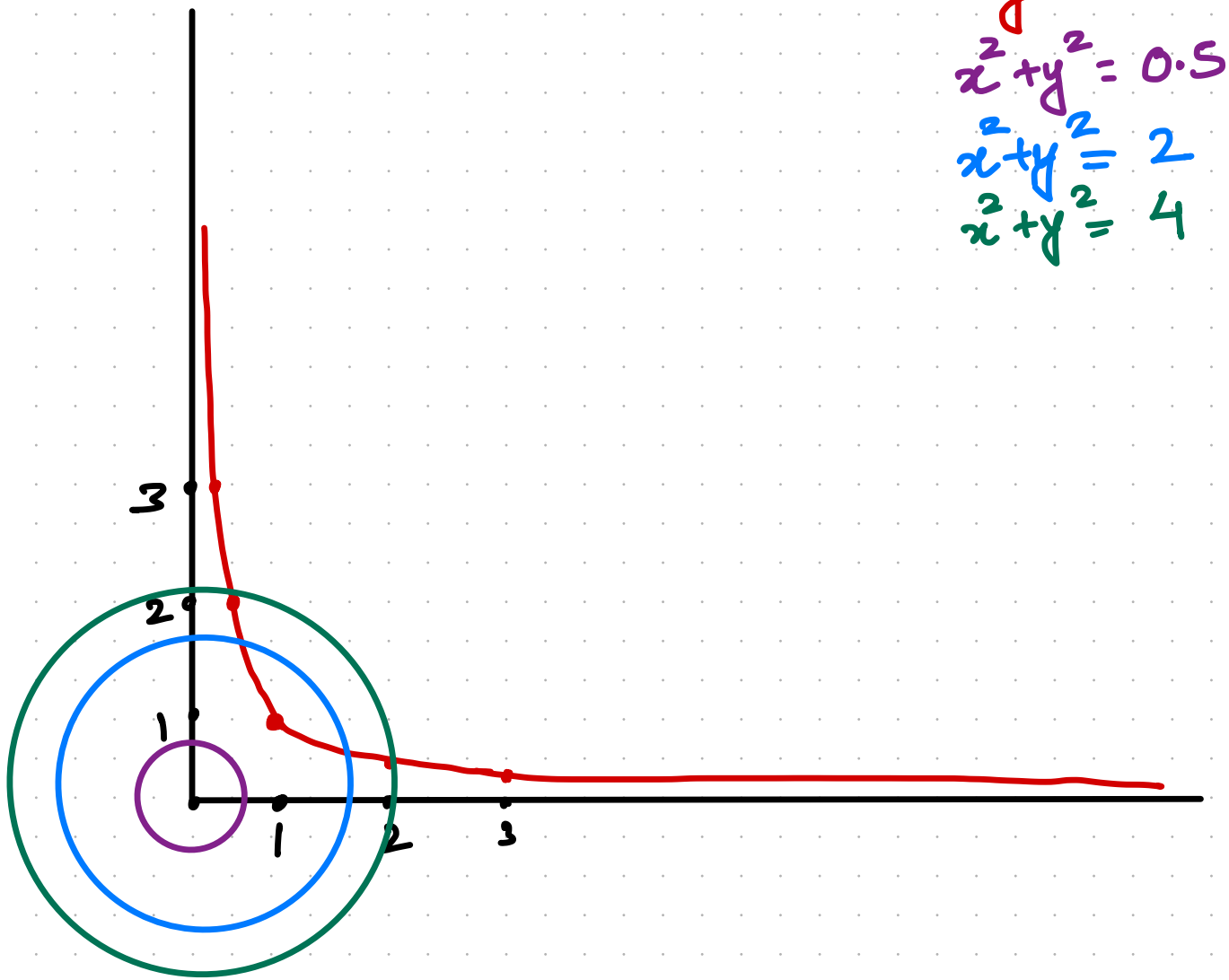


$xy = 1$

$x^2 + y^2 = 0.5$

$x^2 + y^2 = 2$

$x^2 + y^2 = 4$

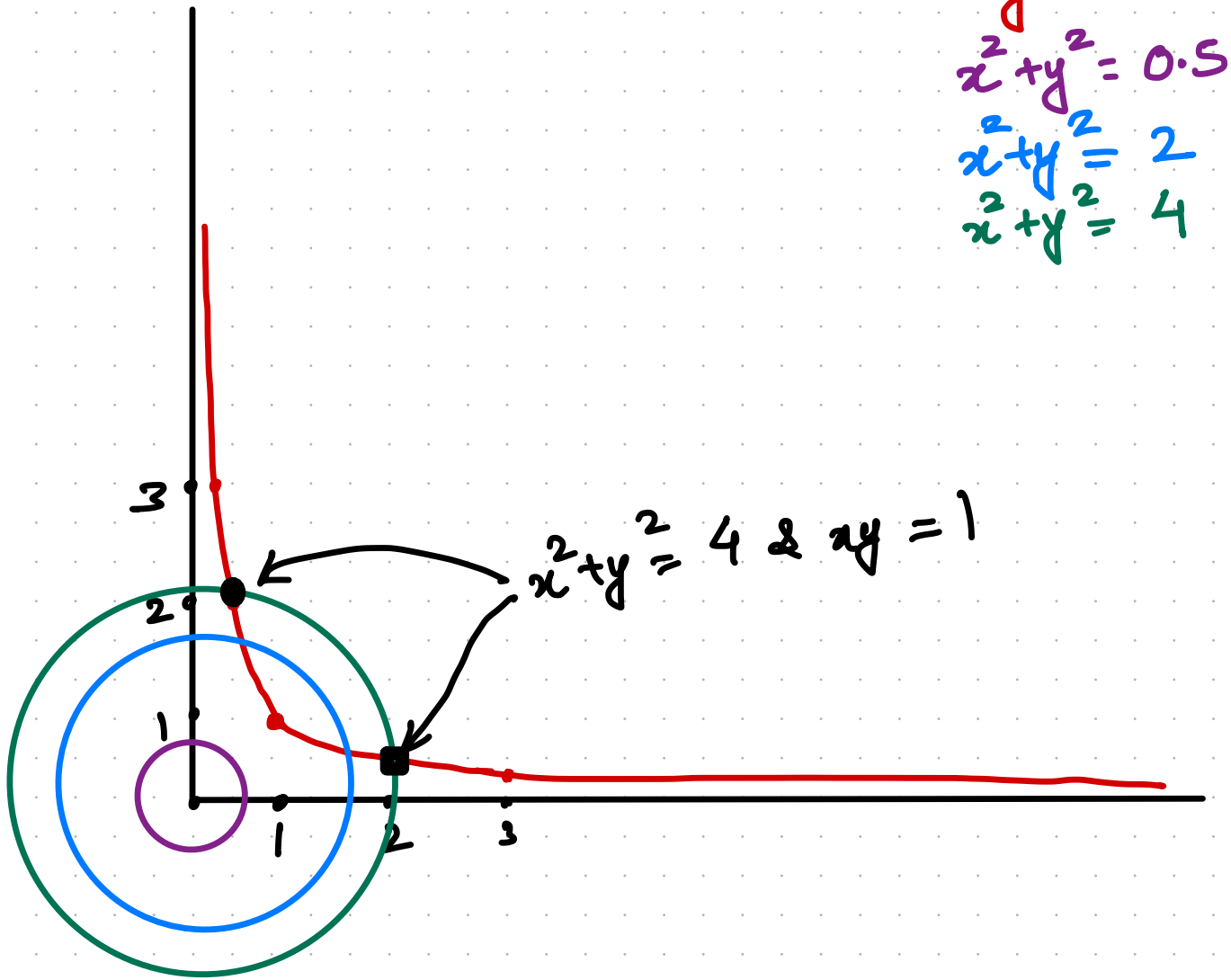


$xy = 1$

$x^2+y^2 = 0.5$

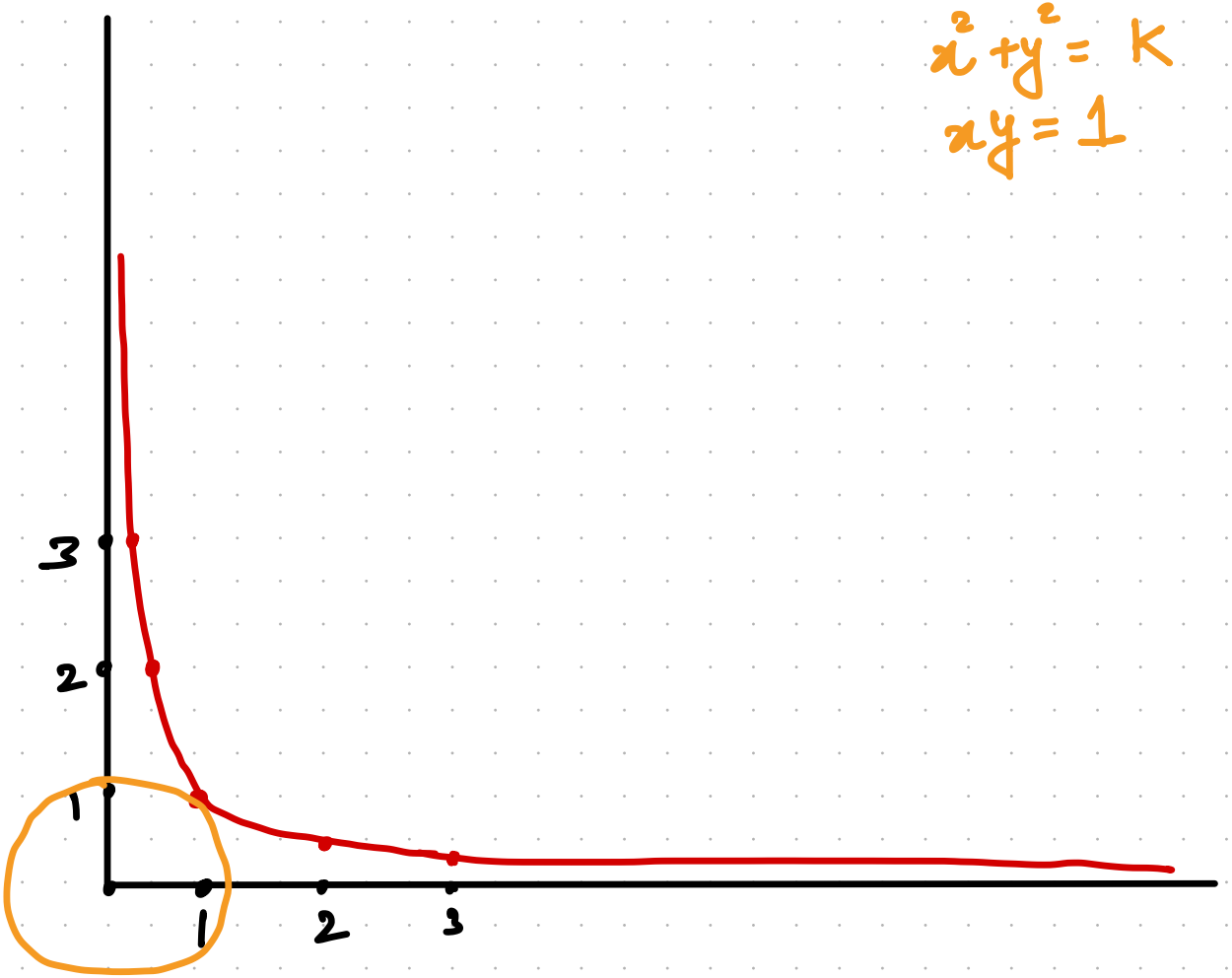
$x^2+y^2 = 2$

$x^2+y^2 = 4$



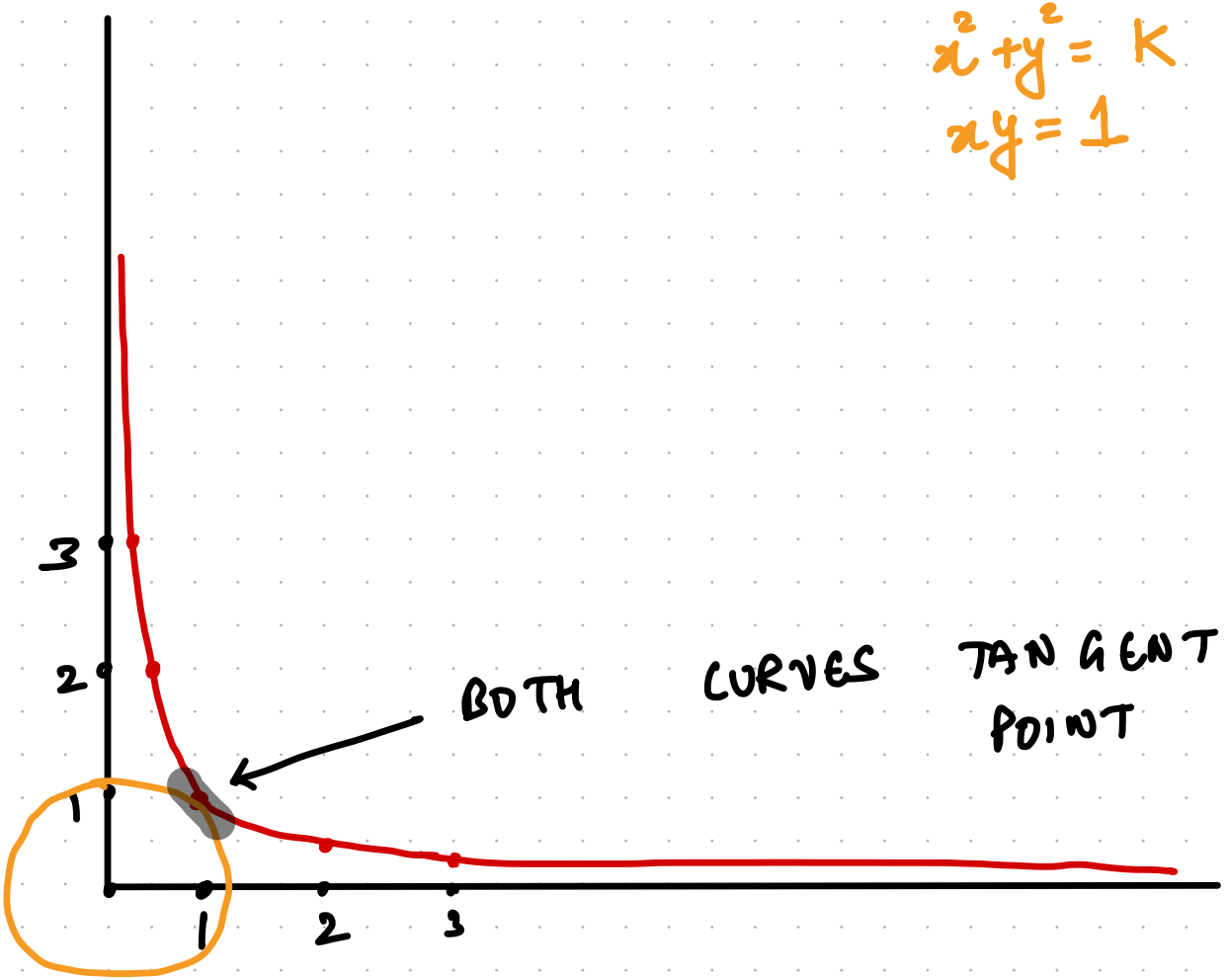
$x^2 + y^2 = k$

$xy = 1$



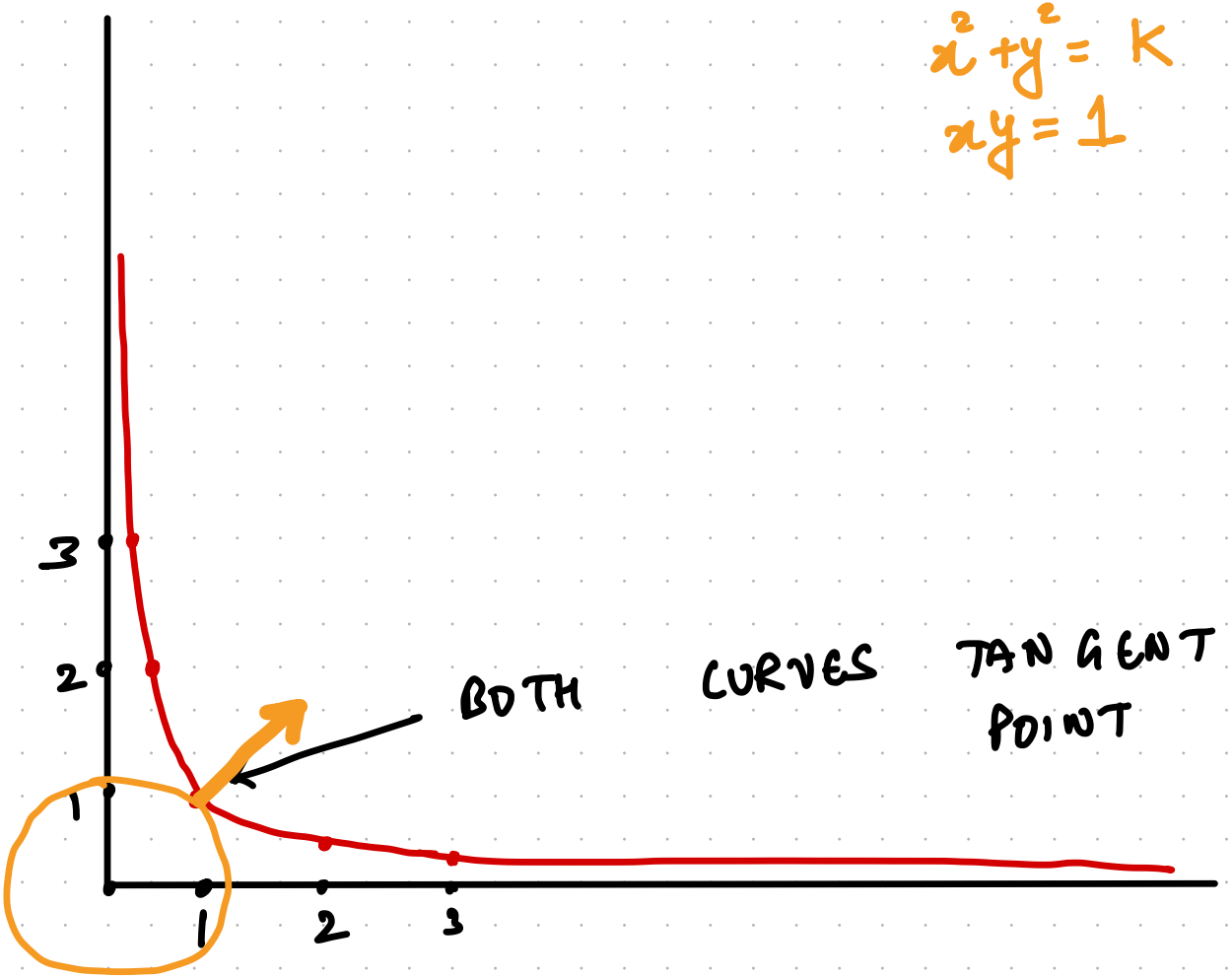
$x^2 + y^2 = k$

$xy = 1$



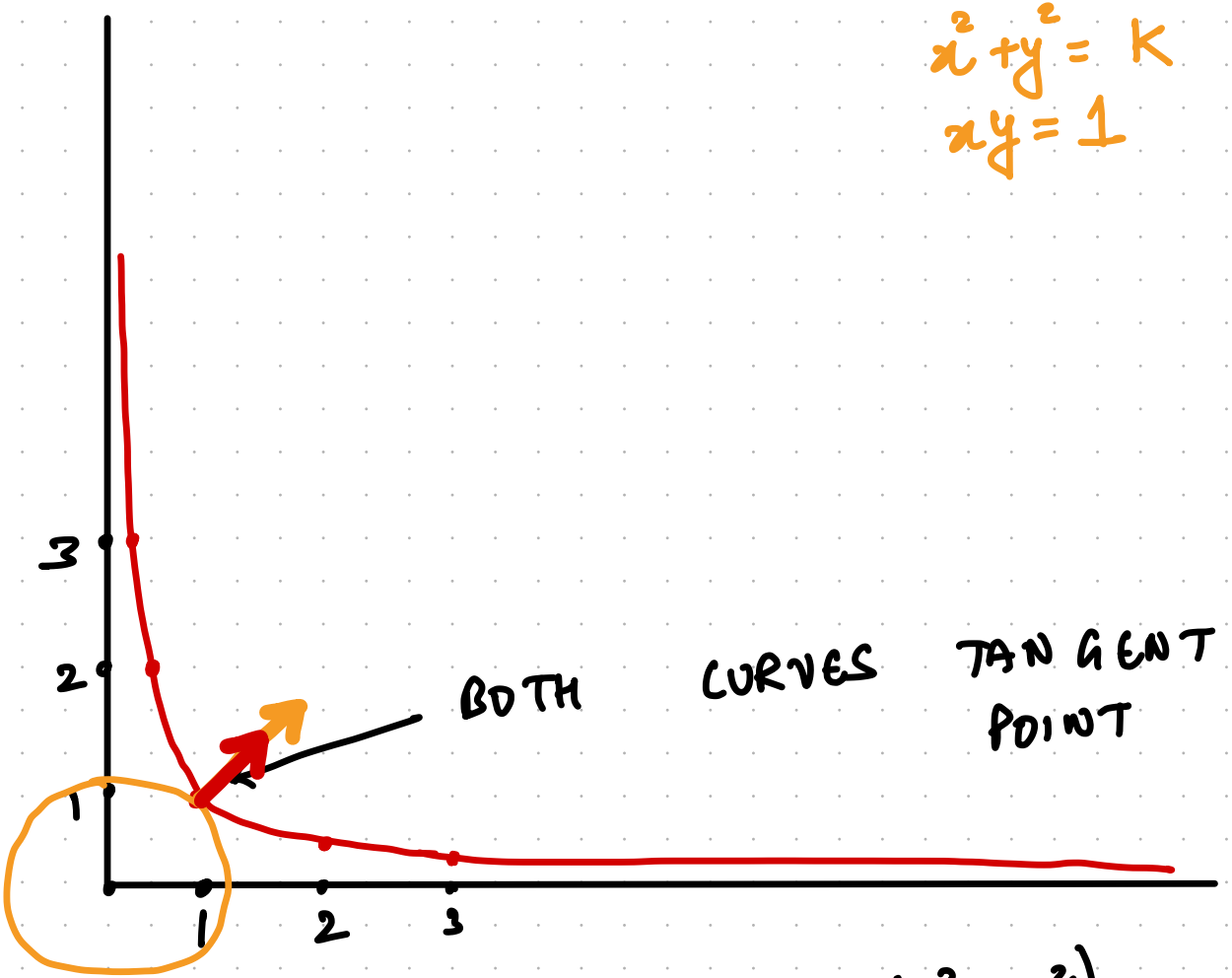
$x^2 + y^2 = k$

$xy = 1$



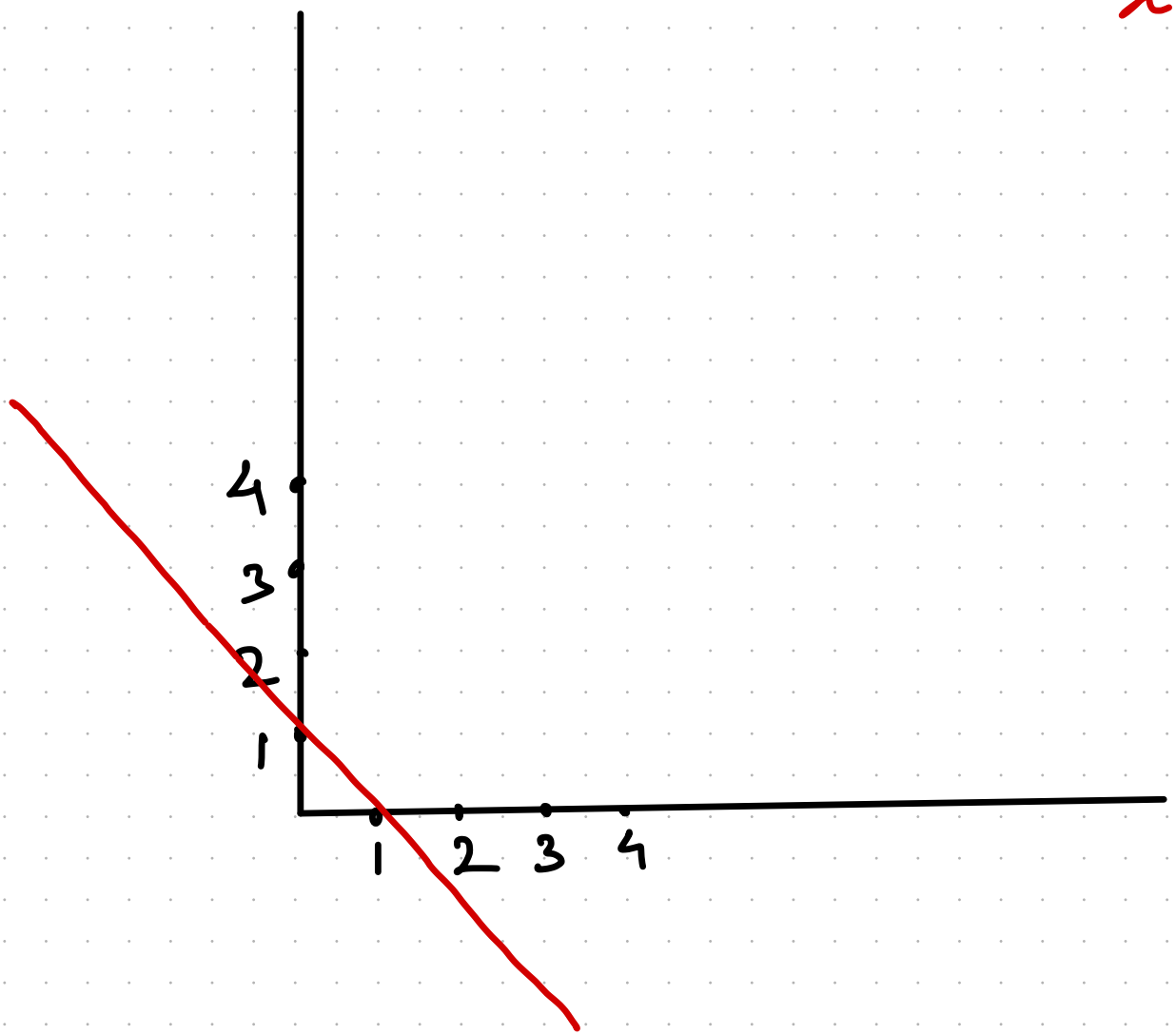
$x^2 + y^2 = k$

$xy = 1$



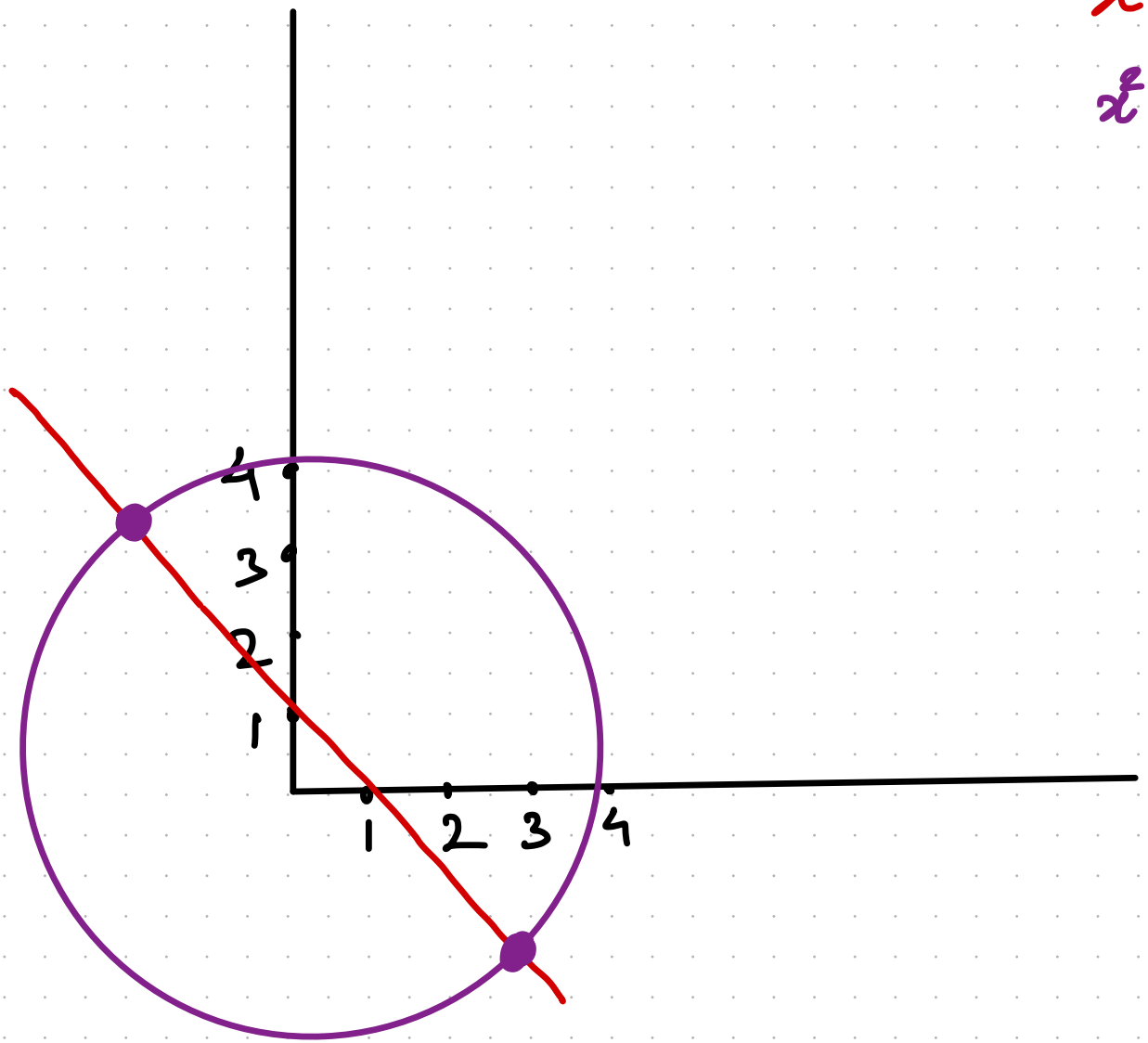
$$\nabla (x^2 + y^2)_{x^*, y^*} = \lambda \nabla (xy)_{x^*, y^*}$$

$x+y=1$



$x+y=1$

$x^2+y^2=4$

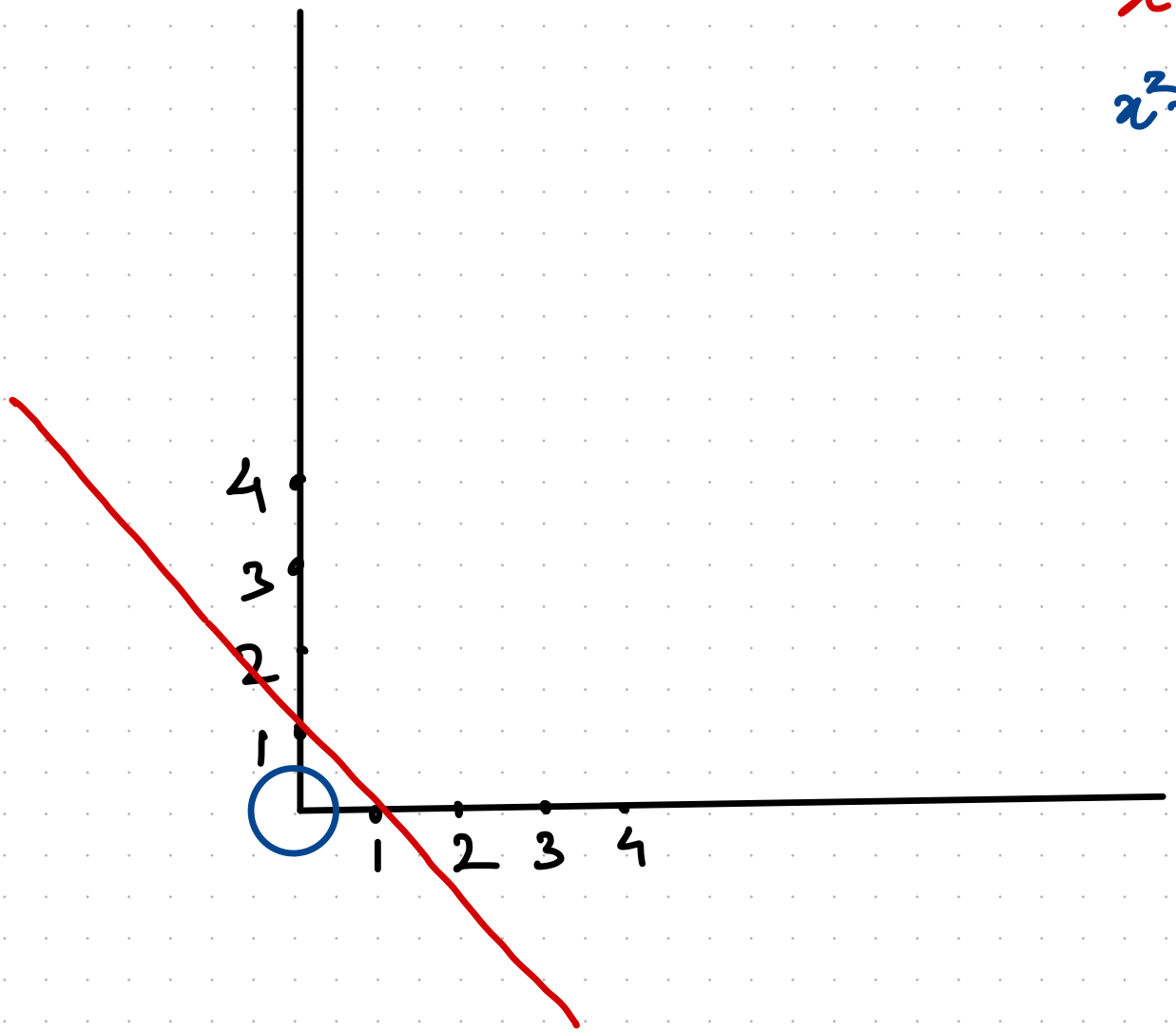


$x+y=1$

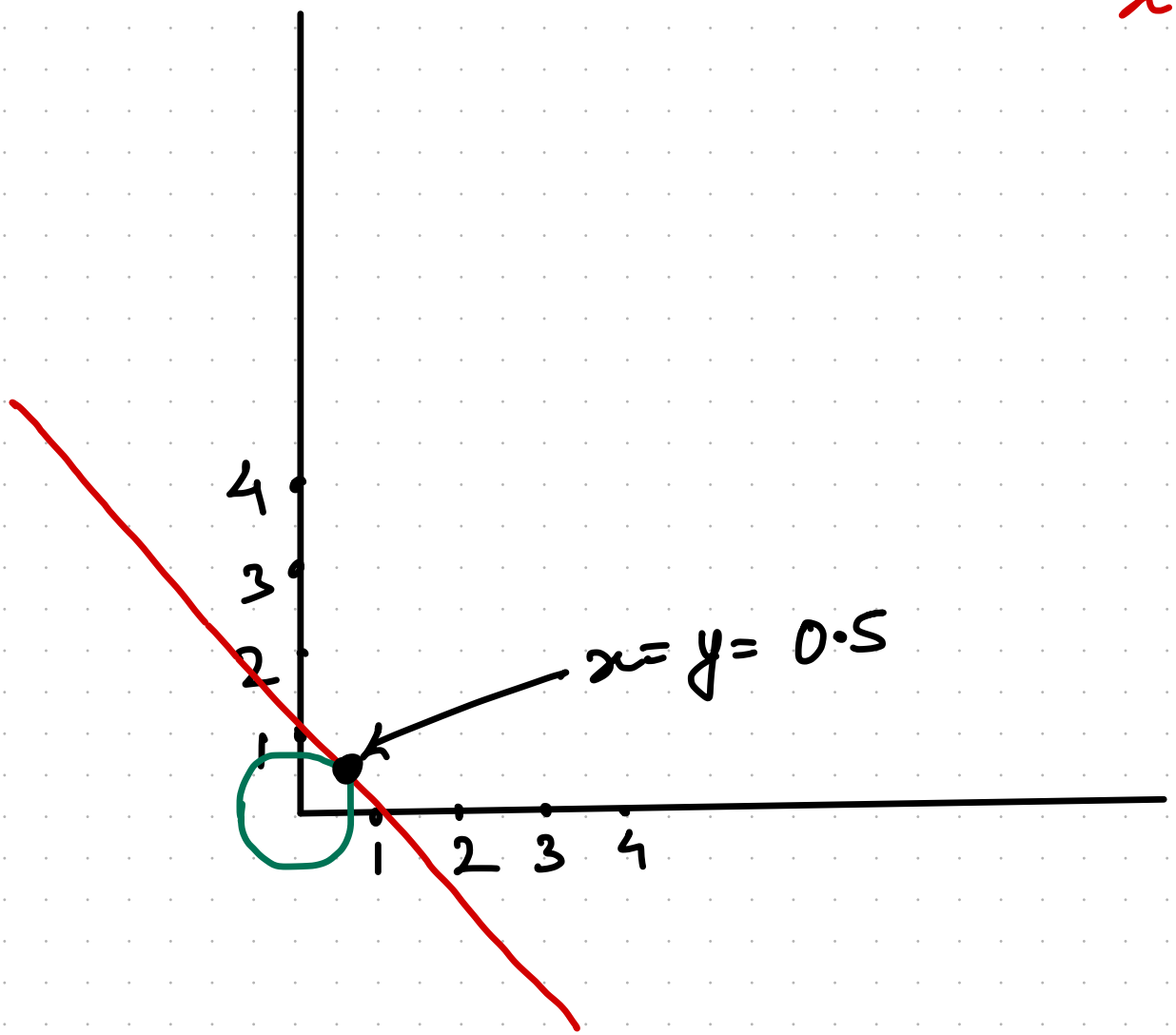
$x^2+y^2=k$

But

$x+y \neq 1$



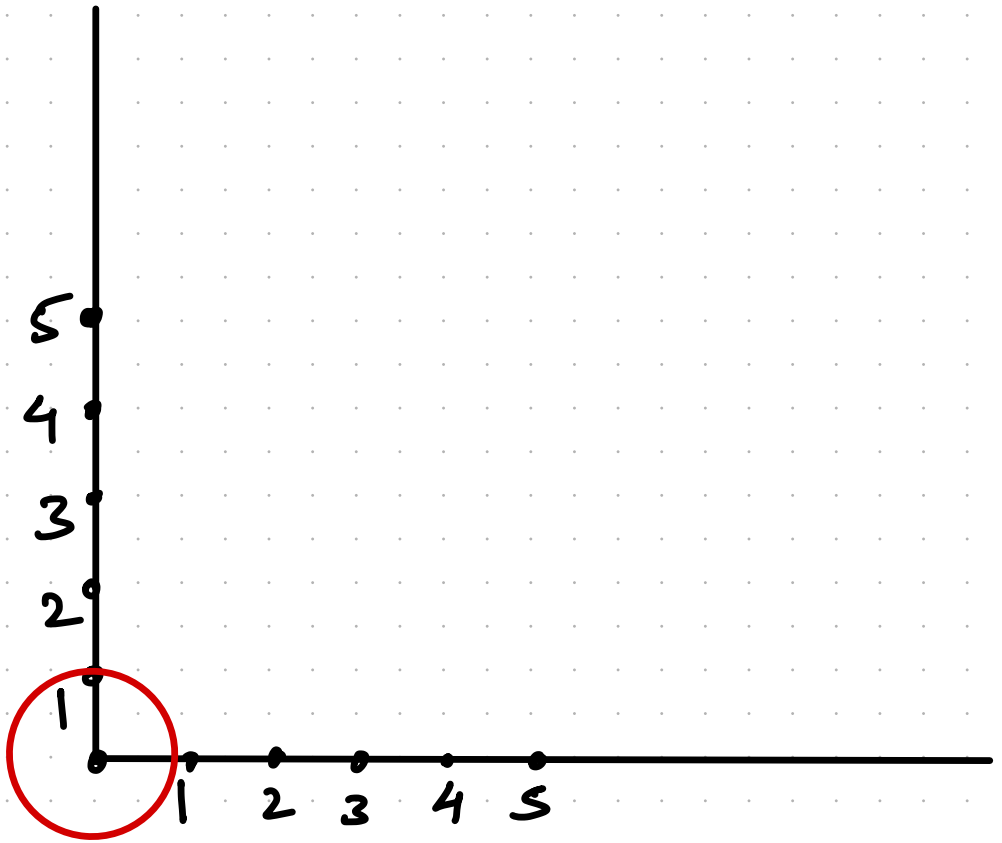
$x+y=1$



$f(x,y) = x^2y$

$g(x,y) = x^2+y^2-1$

$x^2+y^2=1$



$f(x,y) = x^2y$

$g(x,y) = x^2+y^2-1$

$x^2+y^2=1$

$x^2y=1$

Some points

$(1,1)$

$\left(\frac{1}{\sqrt{2}},2\right)$

$\left(2,\frac{1}{4}\right)$

$\left(3,\frac{1}{9}\right)$

$\left(\frac{1}{2},4\right)$