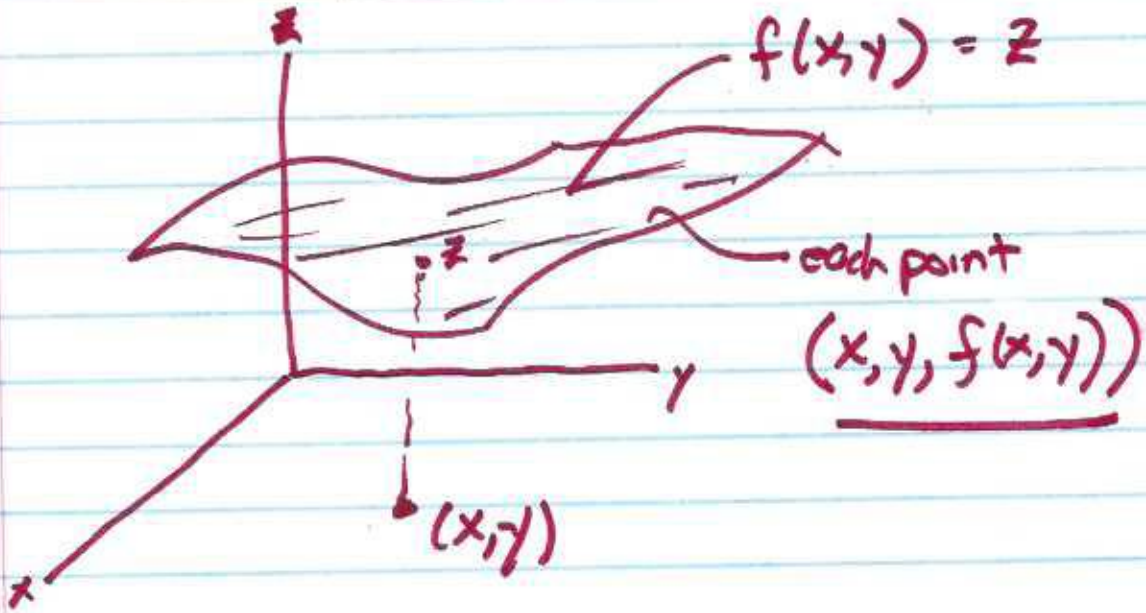
Functions of several variables:

$f(x,y)$, $g(x,y,z)$, ..




Determine domain & range:

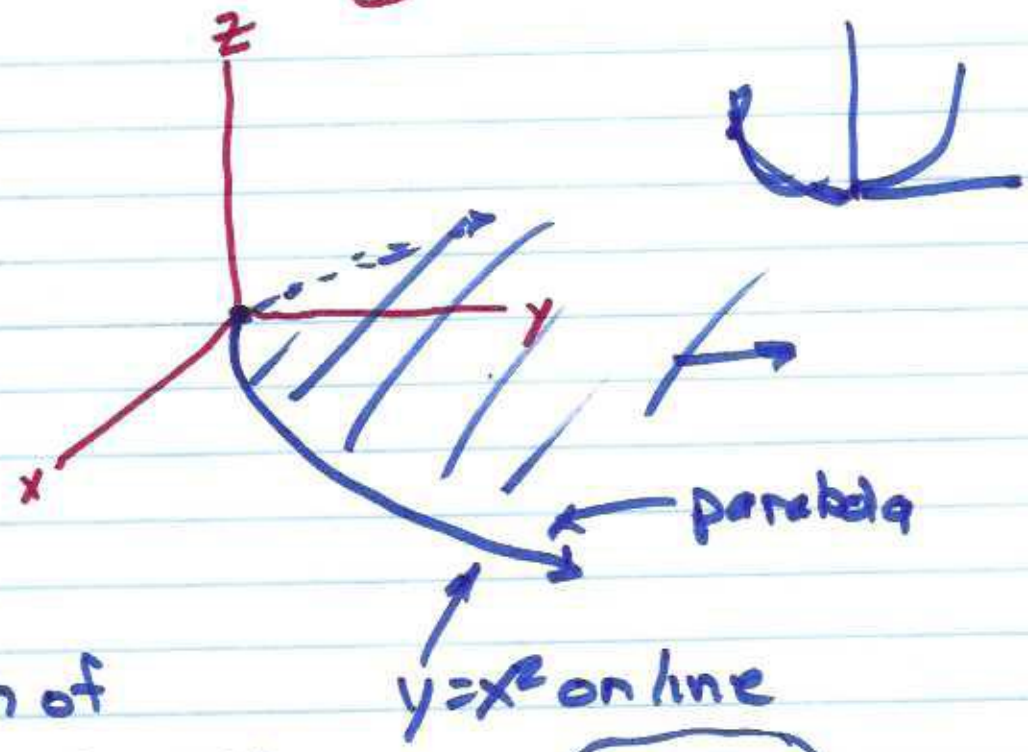
$z = f(x,y)$

① $\sqrt{y-x^2}$ $\quad y - x^2 \geq 0 \rightarrow y \geq x^2$

② $\frac{1}{xy}$

③ $\sin xy$

(2)




domain of

$f(x,y) = \sqrt{y-x^2}$ $\quad [0,\infty)$

range of $f(x,y) = ?$ $\quad [0,\infty]$

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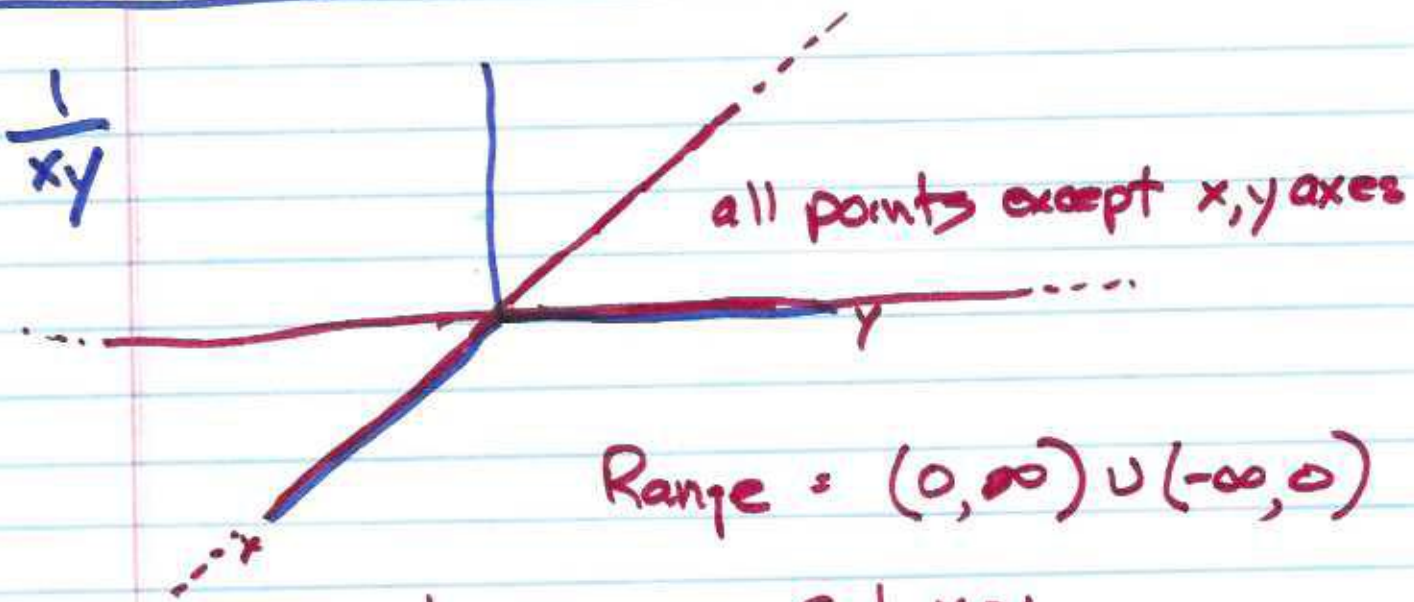
$\frac{1}{xy}$




Range $= (0,\infty) \cup (-\infty,0)$

$r = \frac{1}{xy} =$ $\quad$ Set $x=1$

$r = \frac{1}{y}$

$f(x,y) = \sin xy$

$\text{dom} f = \mathbb{R}^2 \qquad \text{ran} f = [-1,1]$

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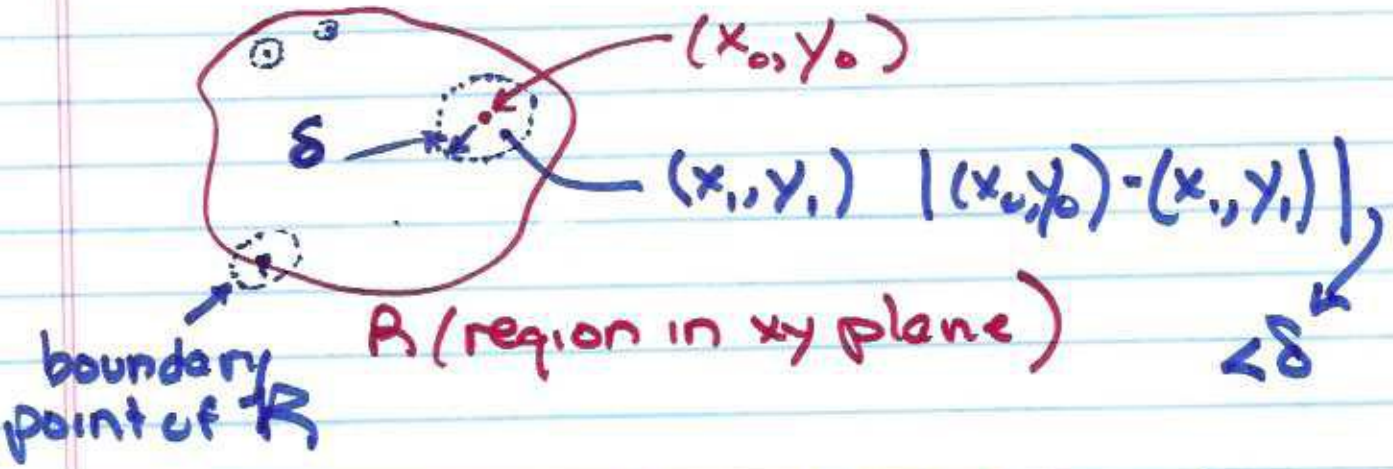


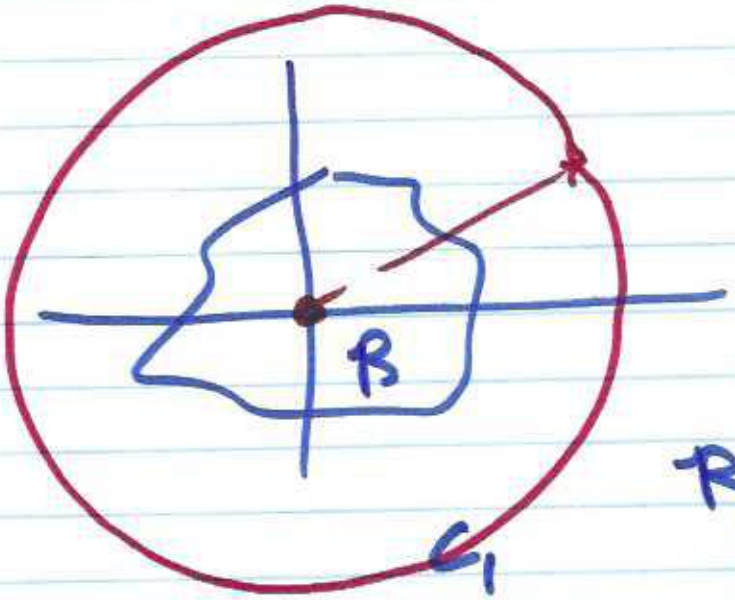

disk of radius $\delta$, centered @ $(x_0, y_0)$

If disk is completely inside R, (whatly)

we say point $(x_0, y_0)$ is an interior point of R.

If R is nothing but interior points, it is called an open set

If boundary belongs to R, R is closed set.




$R \subset C_1$ then

R is said to be bounded.

If not, R is unbounded

$\{\frac{1}{n} : n \in \mathbb{N}\}$ $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \cdots$

$\{(\frac{1}{n}, \frac{1}{2n}) : n \in \mathbb{N}\}$

$(1, \frac{1}{2}), (\frac{1}{2}, \frac{1}{4}) \cdots$