11/22

Wednesday, November 22, 2017 9:36 AM

Section 7.1

Def: A function f of the two independent variables x and y is a rule that assigns to each ordered pair (x, y) in a given set D (the domain of f) exactly one number, denoted $f(x, y)$.

Ex: let $f(x,y) = \dfrac{3x^2+5y}{x-y}$

- Find the domain of f

$$x-y \neq 0$$
$$x \neq y$$

The domain is $\{(x,y) \mid x \neq y\}$

- Find $f(1,-2) = \dfrac{3\cdot 1^2+5(-2)}{1-(-2)} = \dfrac{3-10}{3} = \boxed{\dfrac{-7}{3}}$

$$f(0,2) = \frac{3\cdot 0+5\cdot 2}{0-2} = \boxed{-5}$$

let $f(x,y) = xe^y + \ln x$

Find $f(e^2, \ln 2) = e^2 \cdot e^{\ln 2} + \ln e^2$

$= e^2 \cdot 2 + 2 \cdot \underbrace{\ln e}_{1}$

$= \boxed{2e^2 + 2}$

Ex: A sports store carreis two kinds of tennis rackets. The consumer demand for each brand depends not only on its own price, but also on the competitor pricing. If one brand sells for x \$ per racke, and the other brand for y dollors per racket, the demand for the first brand is

$$D_1 = 300 - 20x + 30y$$

and the other

$$D_2 = 200 + 40x - 10y.$$

Find the Revenue of the store.

$$R(x,y) = D_1 \cdot x + D_2 \cdot y$$

$$= (300 - 20x + 30y)x + (200 + 40x - 10y)y$$

$$= 300x - 20x^2 + 30xy + 200y + 40xy - 10y^2$$

$$= \boxed{-20x^2 - 10y^2 + 70xy + 300x + 200y}$$