Sec 26 Fcns. of Two Independent Variables

HW

#1. $f(x,y) = x^2 + y^2 - x + 2$

a) $f(0,0) = 2$

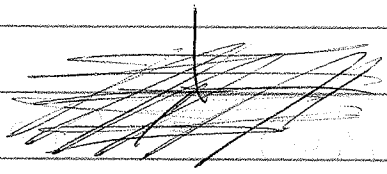
b) $f(1,0) = 2$

c) $f(0,-1) = 3$

d) $f(a,2) = a^2 + 4 - a + 2$
$= a^2 - a + 6$

#3 Find dom

a) $f(x,y) = 2x^2 + 3y^2$ Dom: $x \in \mathbb{R}$, $y \in \mathbb{R}$

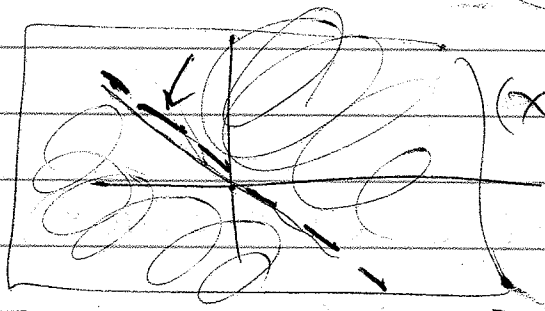


$\mathbb{R} \times \mathbb{R}$

b) $f(x,y) = \frac{6x+5y}{5x+6y}$ $5x+6y \neq 0$

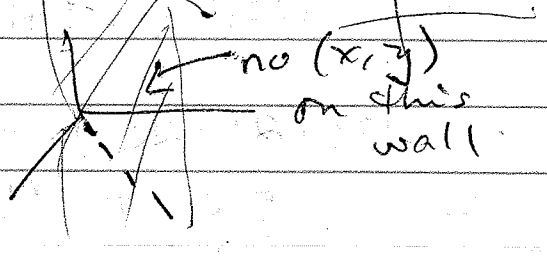
$5x \neq -6y$

$y \neq -\frac{5}{6}x$



(x,y)-plane
$\mathbb{R} \times \mathbb{R}$

$\{(x,y) : y \neq -\frac{5}{6}x\}$



no (x,y) on this wall

#4. $q(m,p) = \frac{100m}{p}$

$q(13.5, 9) = \frac{100(13.5)}{9} = \frac{1350}{9} = \boxed{150}$

#5 $f(x,y) = 50x + 5y^2$, x = # of skilled workers
y = # of unskilled "

a) $f(20,40) = 50(20) + 5(40^2) = 1000 + 8000 = \boxed{9000}$

b) $f(20,41) = 50(20) + 5(41^2)$ } difference = ?
$f(20,40) = 9000$

Do some tricky algebra instead of big multiplications

$50(20) + 5(41^2) - 50(20) - 5(40^2)$
$= 5(41^2 - 40^2) = 5(41+40)(41-40)$
$= 5(81)(1) = \boxed{405}$

c) $f(21,40) - f(20,40) = 50(21) + 5(40^2) - (50(20) + 5(40^2))$
$\approx \frac{\partial f}{\partial x}$ $= 50(21-20) = \boxed{50}$

d) $f(21,41) - f(20,40)$

$= 50(21) + 5(41^2) - (50(20) + 5(40^2))$
$= 50(21-20) + 5(41-40)(41+40)$
$= 50 + 405 = \boxed{455}$

Sec 26 – con'd

#6. $P(x,y) = 100\left(\frac{3}{5}x^{-2/3} + \frac{2}{5}y^{-2/3}\right)^{-3}$

x = labor in work-hours

y = amt of capital

a) $P(64,4) = 100\left(\frac{3}{5}(64^{-2/3}) + \frac{2}{5}(4^{-2/3})\right)^{-3}$

b) $P(16,236) =$

#7 a) $C(x,y) = 5x + 22y + 15$

b) $C(20, 2.5) = 5(20) + 22(2.5) + 15$

$= \boxed{\$170}$

#8. a) $C(x,y,z) =$