SI Session: Oct. 13th, 15th & 17th, 2008
Mondays: 1:30 PM – 3:00 PM & 4:50 PM – 6:20 PM
Wednesdays: 1:30 PM – 3:00 PM & 4:50 PM – 6:20 PM
Fridays: 1:00 PM – 2:30 PM
Room 1239 SNAD

Prof. Stockton : Calculus III
Fall 2008
SI Leader : Neil Jody

[1] Describe the domain and range of the function.

(a) $f(x, y) = \arcsin(x + y)$

(b) $f(x, y) = \arccos\left(y/x\right)$

(c) $z = \dfrac{x + y}{xy}$

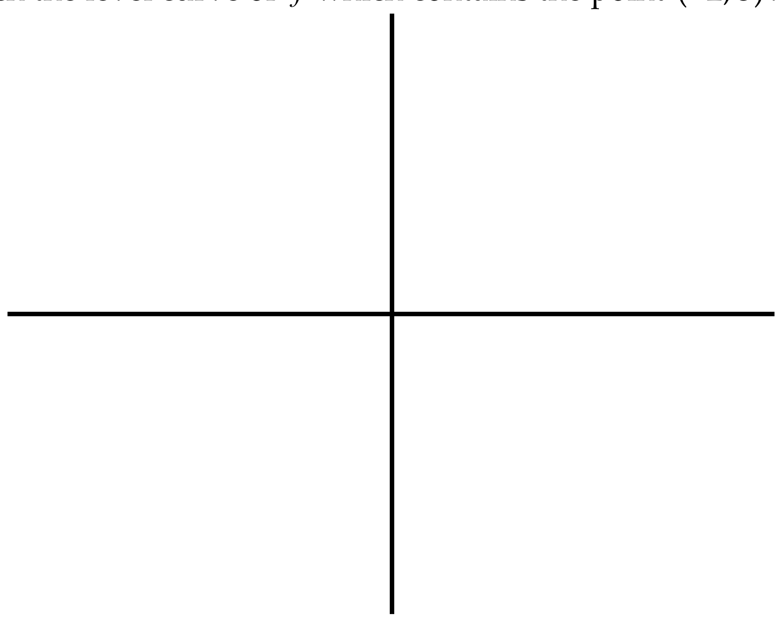
(d) $f(x, y) = x\sqrt{y}$

[2] Let $f(x,y) = 3e^{x^2-y-1}$.

(a) Determine the domain of f.

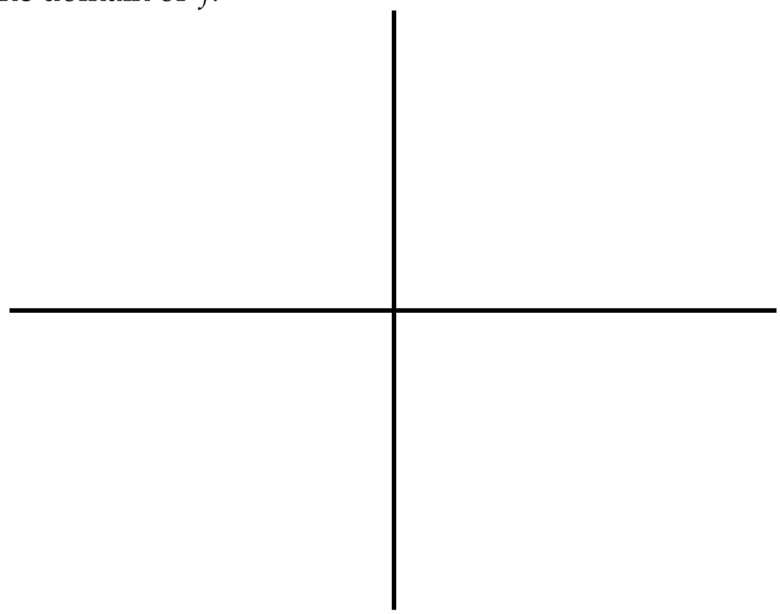
(b) Determine the range of f.

(c) Sketch the level curve of f which contains the point $(-2, 3)$.



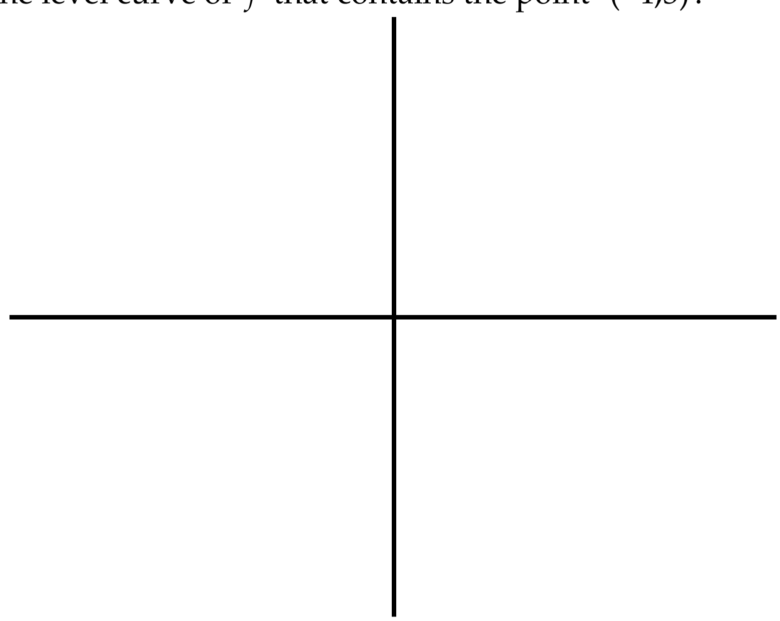
[3] Let $f(x,y)=\sqrt{x^2+y}$.

(a) Sketch the domain of f.



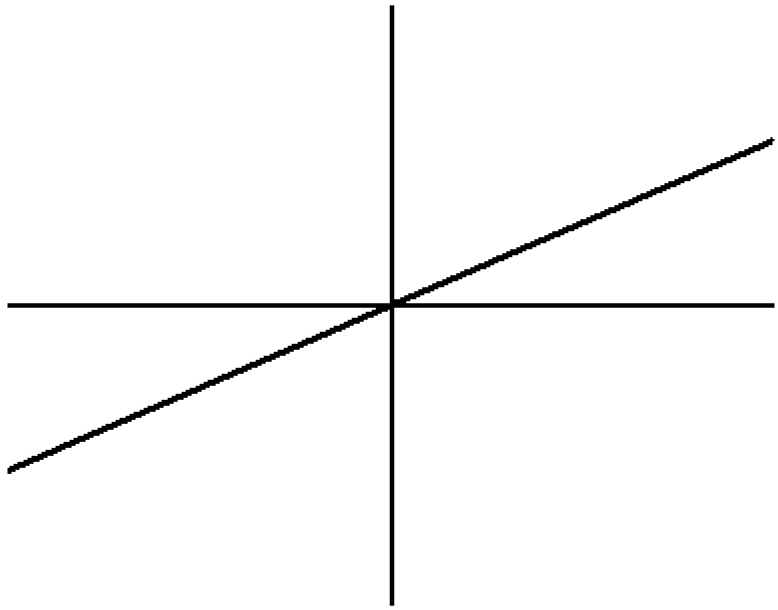
(b) Determine the range of f.

(c) Sketch the level curve of f that contains the point $(-1,3)$.

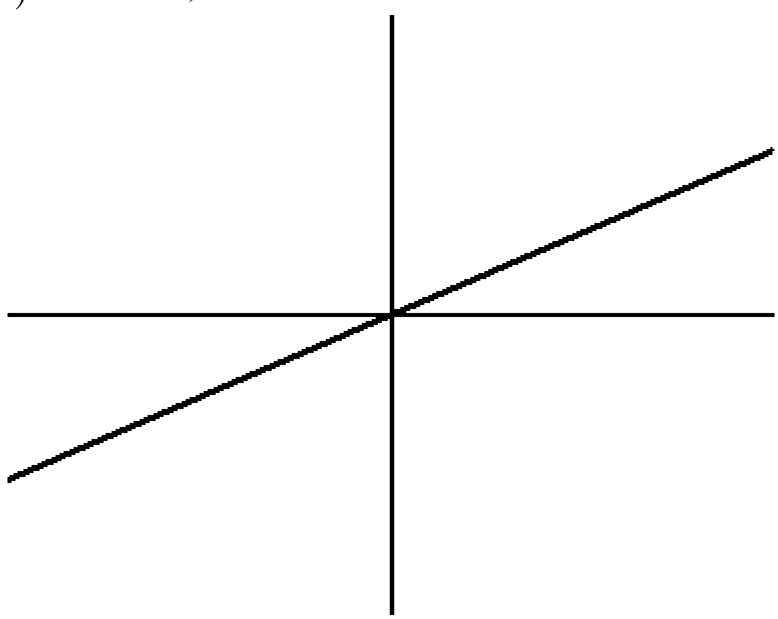


[4] Sketch the graph of the level surface $f(x,y,z)=c$.

(a) $f(x,y,z)=4x+y+2z$, $c=4$



(b) $f(x,y,z)=\sin x - z$, $c=0$



[5] Find both first partial derivatives.

(a) $f(x, y) = x^2 - 3y^2 + 7$

(b) $z = 2y^2\sqrt{x}$

(c) $f(x, y) = \ln(x^2 + y^2)$

(d) $z = \sin 3x \cos 3y$

(e) $z = \cos(x^2 + y^2)$

[6] Evaluate f_x and f_y at the given point.

(a) $f(x,y) = \arccos xy$, $(1,1)$

(b) $f(x,y) = \dfrac{6xy}{\sqrt{4x^2 + 5y^2}}$, $(1,1)$

[7] For $f(x,y)$, find all values of x and y such that $f_x(x,y)=0$ and $f_y(x,y)=0$ simultaneously.

(a) $f(x,y)=3x^3-12xy+y^3$

(b) $f(x,y)=\ln(x^2+y^2+1)$

[8] Find w_s and w_t using the appropriate chain rule, and evaluate each partial derivative at the given values of s and t.

(a) $w = y^3 - 3x^2y$; $x = e^s$, $y = e^t$, at the point $s = 0$ and $t = 1$

(b) $w = \sin(2x + 3y)$; $x = s + t$, $y = s - t$, at the point $s = 0$ and $t = \frac{\pi}{2}$

[9] If $w = xy^2$ and $x = 2s - t, y = t^2$, use the Chain Rule to find w_t at the point $(-1, 2)$ in the st-plane.

[10] Suppose w is a function of r and s and $r = xy + yz^2$, $s = \sin y + e^{xz}$. Use the information given below to compute $w_y(-1, 0, 0)$:
$w_r(0,1) = 2$, $w_s(0,1) = 5$

[11] If p is a differentiable function of *u*, *v*, and *w*, and if $u = x - y$, $v = y - z$, and $w = z - x$, show that $p_x + p_y + p_z = 0$.