

# In Class Work

1. Let  $f(x, y) = \sqrt{x^2 + 4y^2}$ .

- (a) Identify the surface  $z = f(x, y)$  by sketching traces or plotting it in Maple.
- (b) On a single set of 2-dimensional axes, sketch the traces  $z = 1$ ,  $z = 2$ ,  $z = 3$ , and  $z = 4$  to form a *contour plot* of the surface. Pay attention to the relationship between the contour plot and the surface.

# In Class Work

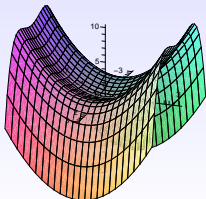
2. Match the functions to the surfaces:

(a)  $f(x, y) = x^2 - \frac{x^4}{4} + y^2$

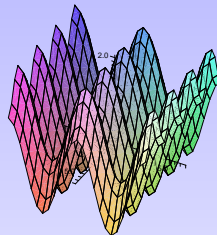
(b)  $f(x, y) = (\sin(x))^2 + y^2$

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

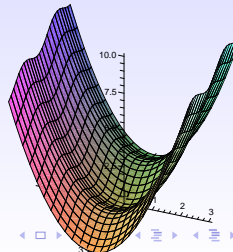
Surface B



Surface A



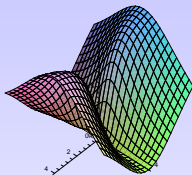
Surface C



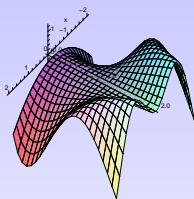
# In Class Work

3. Match the surfaces to the contour plots

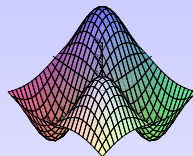
Surface (a)



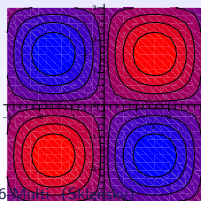
Surface (b)



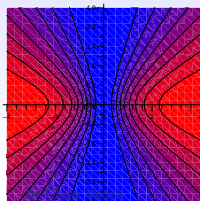
Surface (c)



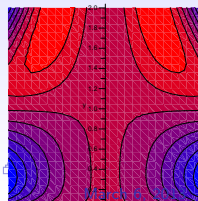
Contour Plot A



Contour Plot B



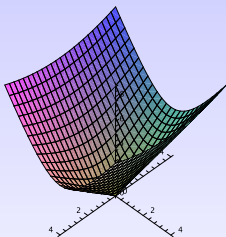
Contour Plot C



## Solutions

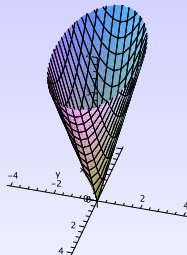
1. (a) For  $f(x, y) = \sqrt{x^2 + 4y^2}$ , identify the surface  $z = f(x, y)$  by sketching traces or plotting it in Maple.

First try in Maple, on left – hard to tell what it is. Adjusted the z-range and now it's clear it is the upper half of an elliptic cone:



`plot3d(sqrt(x^2+4*y^2),`

`x=-4..4, y=-4..4,`  
Math 236-Multi (Sklensky)

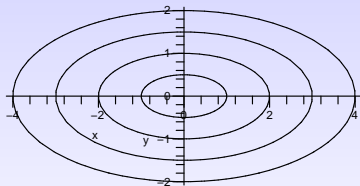


right-click on graph - axes - prop-  
erties

change z to going from 0 to 4

## Solutions

1. (b) For  $f(x, y) = \sqrt{x^2 + 4y^2}$ : on a single set of 2-dimensional axes, sketch the traces  $z = 1$ ,  $z = 2$ ,  $z = 3$ , and  $z = 4$  to form a *contour plot* of the surface. Pay attention to the relationship between the contour plot and the surface.



# Solutions

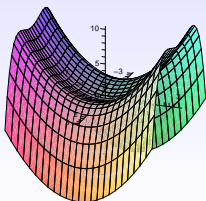
2. Match the functions to the surfaces:

(a)  $f(x, y) = x^2 - \frac{x^4}{4} + y^2$

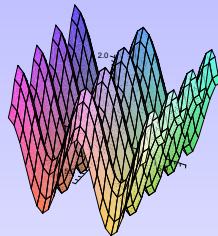
(b)  $f(x, y) = (\sin(x))^2 + y^2$

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

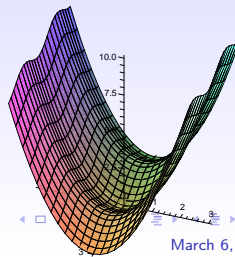
Surface B  $\longleftrightarrow$  (a)



Surface A  $\longleftrightarrow$  (c)



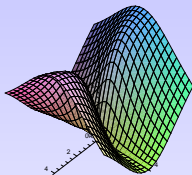
Surface C  $\longleftrightarrow$  (b)



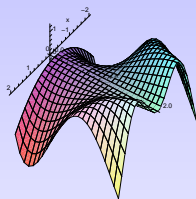
# Solutions

## 3. Match the surfaces to the contour plots

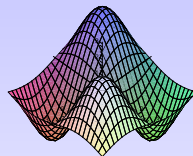
Surface (a)



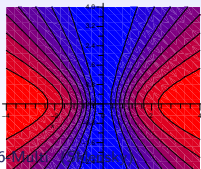
Surface (b)



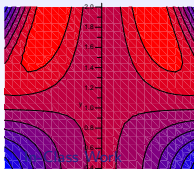
Surface (c)



Contour Plot B



Contour Plot C



Contour Plot A

