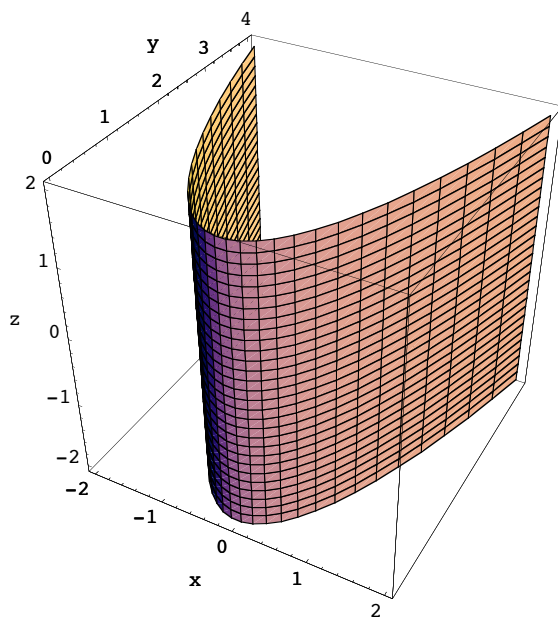


Calculus III

Lab #3: Cylindrical and Quadric Surfaces

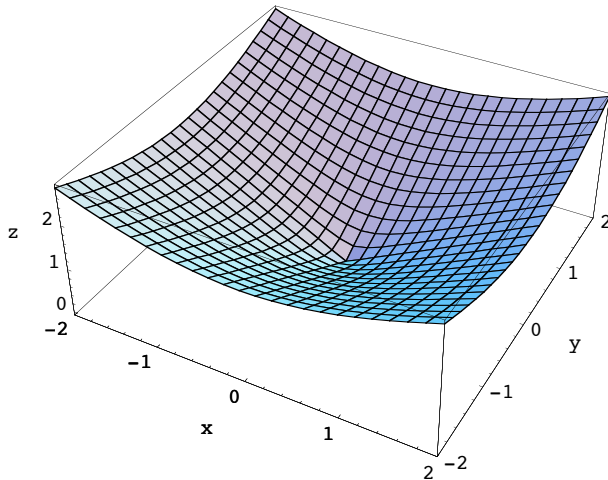
- To graph cylindrical surfaces, use the `ParametricPlot3D` *Mathematica* function. To graph the cylindrical surface $y = x^2$ (note the missing z variable), do the following:

```
x[t_] := t;  
y[t_] := t^2;  
z[t_] := s;  
p1 = ParametricPlot3D[{x[t], y[t], z[t]}, {t, -2, 2}, {s, -2, 2}, AxesLabel -> {x, y, z}];
```



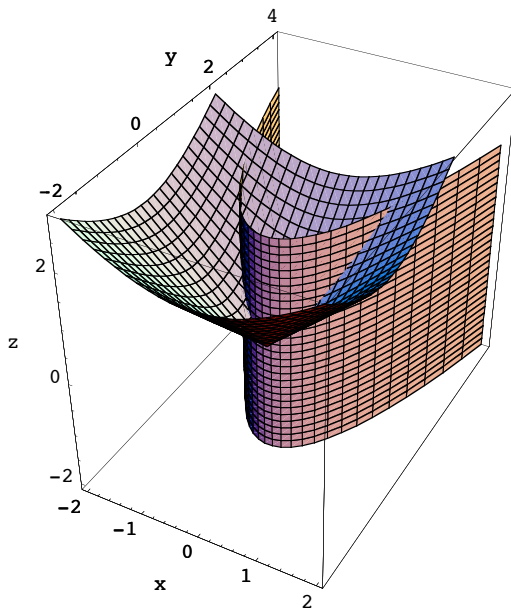
- Please note how the graph travels parallel to the z-axis. To plot a quadric surface use the Plot3D function as illustrated when plotting $z = \sqrt{x^2 + y^2}$:

```
f[x_, y_] :=  $\sqrt{x^2 + y^2}$  ;  
p2 = Plot3D[f[x, y], {x, -2, 2}, {y, -2, 2}, AxesLabel -> {x, y, z}];
```



- To show two or more plots in the same graph, use the Show function:

```
Show[p1, p2];
```



■ Exercises

- 1. Plot $y = \sin(x)$ and $x = \sin(y)$ from $-\pi$ to π separately and then together.
- 2. Plot $z = 8 - x^2 - y^2$ and $z = x^2 + y^2$ together.
- 3. Define and plot two intersecting planes.
- 4. Define at least two surfaces of your choice and plot them together.