Math 254 **Computer Lab 1** **20 Points**

Do most of your work on Mathematica. Be sure to use a "text" cell when writing non-mathematical verbage. Click on Format, Style, in the tool bar and use a desired style, or use the Writing Assistant Palette.

Save your notebook (.nb file) to a thumb drive, and email me the notebook (chuck.stevens@skagit.edu). You should be able to delete all output cells, and then reevaluate the input cells to recreate the plots and other output.

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1. Choose two problems from 14.1.49-52. Create a plot of the surface, and a level curve plot (contour plot). Choose an appropriate domain for each plot in order to show the interesting aspects of each function. You can use the `Row[{...}]` command to get side-by-side plots.

2. 14.1.69 Create a `Manipulate` to explore the graph (see other side for how to create a manipulate) and write down your observations.

3. 14.2.22 Make a plot of the surface, and include two paths that show the limit as $(x, y) \to (0, 0)$. Make one path red and the other blue. The paths will need to be parametric.

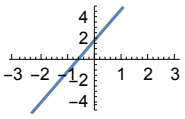
4. 14.3.42 Make a plot of the surface (using `ContourPlot3D`). See if you can get Mathematica to find $\partial z/\partial x$. Hint: for implicit differentiation you'll need to write the unknown function z as `z[x,y], and then use Solve` to isolate $\partial z/\partial x$.

5. 14.3.84 Graph the paraboloid, plane, parabola, and tangent line on the same screen.

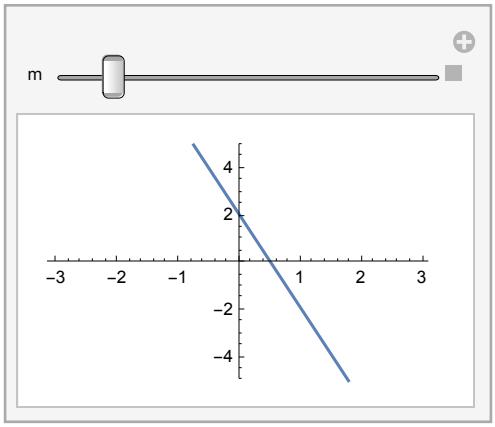
6. 14.4.9 Just provide a plot of the surface and tangent plane.

Manipulate Example:

```
Plot[3 x + 2, {x, -3, 3}, PlotRange → {-5, 5}]
```




```
Manipulate[
 Plot[m x + 2, {x, -3, 3}, PlotRange → {-5, 5}, ImageSize → 200],
 {m, -5, 5}
]
```




```
Manipulate[
 Plot[m x + b, {x, -3, 3}, PlotRange → {-5, 5}, ImageSize → 200],
 {m, -5, 5},
 {{b, 0}, -5, 5, .1, Slider, ImageSize → Small,
  ControlPlacement → Bottom, Appearance → "Labeled"},
 AppearanceElements → None
]
```