Assignment 1

Posted 20150713; due ??

Problems by Branko Ćurgus

```
NotebookDirectory[]
```

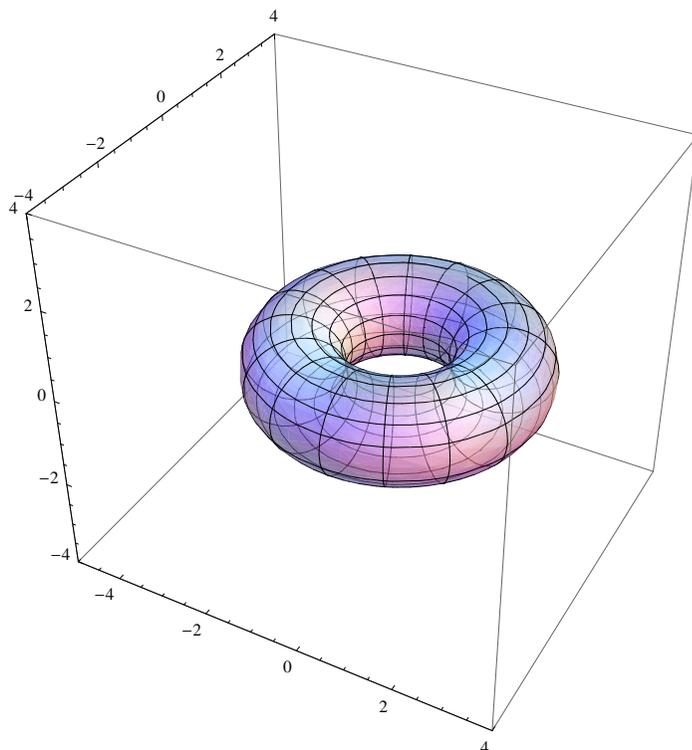C:\Dropbox\Work\COURSES\225\2015\Mathematica_assignments\

Problem 1: When I was an undergraduate sudent

On August 8, 2013, I posted about a problem that I was assigned as an undergraduate student. Read this post and replicate as much of it as you can.

Problem 2: Is a torus in a way

Consider the torus

```
ParametricPlot3D[(2 + Cos[s]) (Cos[θ] {1, 0, 0} + Sin[θ] {0, 1, 0}) - Sin[s] {0, 0, 1},
 {θ, 0, 2 Pi}, {s, 0, 2 Pi}, PlotStyle → {Opacity[0.6]},
 PlotRange → {{-5, 4}, {-4, 4}, {-4, 4}}]
```
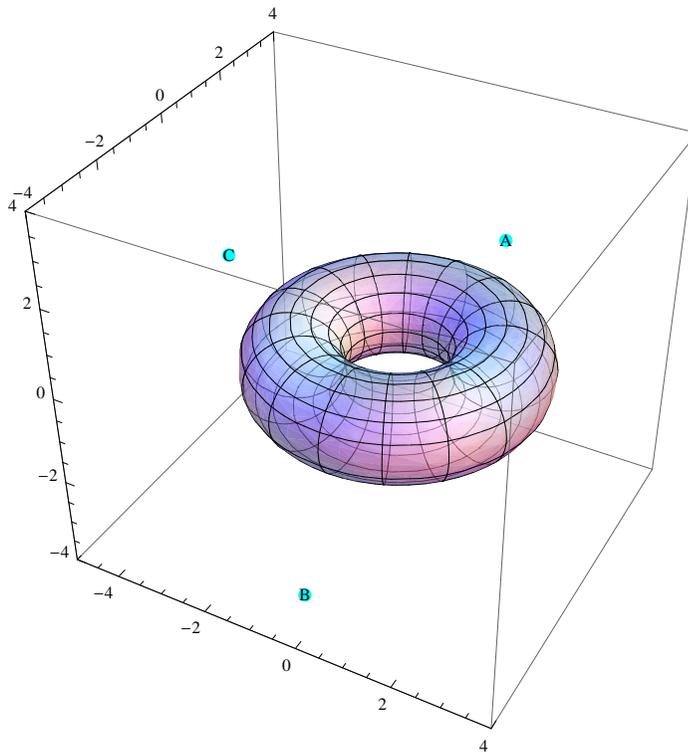
This torus is opaque. It is not transparent. I pictured it transparent for a nicer picture.

Also consider the following three points:

```
pA = {1, 5/2, 13/8}; pB = {1/4, -4, -5/2}; pC = {-35/8, 1, 1/2};
Show[ParametricPlot3D[
   (2 + Cos[s]) (Cos[θ] {1, 0, 0} + Sin[θ] {0, 1, 0}) - Sin[s] {0, 0, 1}, {θ, 0, 2 Pi},
   {s, 0, 2 Pi}, PlotStyle → {Opacity[0.6]}, PlotRange → {{-5, 4}, {-4, 4}, {-4, 4}}],
 Graphics3D[{{PointSize[0.02], Cyan, Point[{pA, pB, pC}]},
    {Text["A", pA], Text["B", pB], Text["C", pC]}}]
]
```


Explore visability of these points from each other. That is, answer whether the point A is visable from the point B, whether the point B is visable from the point C and whether the point C is visable from the point A. Please be detailed in your answer. State the all relevant facts that you find out. Illustrate with *Mathematica* plot.

Problem 3: Just replicate

Problem 4: Length of an ellipse