Math 182 Recitation 1-10

Due at recitation, Thurs. Jan. 10, 2008

1. Let L be a line in $\mathbf{R}^3$ (three-space), and let $a_1x+b_1y+c_1z=d_1$, $a_2x+b_2y+c_2z=d_2$ be two distinct planes containing L.

Show that for any real numbers u and v, not both 0,

$$u(a_1x+b_1y+c_1z-d_1)+v(a_2x+b_2y+c_2z-d_2)=0$$

is the equation of a plane containing L.

It is in fact true that other than these there are no further planes containing L. You might try convincing yourself of that—but it needn't be handed in.

2. Find the equation of the cylinder in $\mathbf{R}^3$ consisting of all lines that are parallel to the vector (3,2,1) and that pass through a point on the curve $y=e^x,\ z=x+e^x$.

In what follows, page numbers refer to the text.

You can also be view these problems online at coursecompass.com by clicking through to Chapter Contents/Chapter12/Section 12.6/Multimedia textbook exercise set.

3. p. 882, `#78`.

4. p. 883, `#80`.

Recall that the area of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is πab.

5. p. 883, `#81`.