AMAT 309 L02

Winter 2003
Midterm Key

1. For each of the following answer True or False, answers:
   True, True, False, True, True, False, False, False, False, False

2. Arc length equals $2e^6 + 1$.

3. (a) elliptical paraboloid

   (b) ellipsoid

   (c) paraboloid of revolution

   (d) cone (circular)

   (e) hyperboloid of two sheets

4. Question 4, from Chapter 13, omitted

5.
$$\frac{\partial z}{\partial s} = \sin(\frac{y}{x})(\frac{3y}{x^2} - \frac{2}{x})$$

6. First find the two normals at P :
   $\nabla_1 = \langle -2xy, -x^2, 9z^2 \rangle, \quad \nabla_2 = \langle -2x, 4, 0 \rangle$
   (the first comes from the first equation $3z^2 - x^2y - 2 = 0$, the second
   from the second equation $4y - x^2 - 3 = 0$.
   $\nabla_1(P) = \langle -2, -1, 9 \rangle, \quad \nabla_2(P) = \langle -2, 4, 0 \rangle$
   Now simply check that $\nabla_1(P) \bullet \nabla_2(P) = 0$.