Math 126 E - Spring 2012
Mid-Term Exam Number One
April 19, 2012
Answers

1. The plane is $2(x-1)+18(y-2)+2(z-3)=0$ or, equivalently, $2x+18y+2z=44$.

2. (a) There are many possible acceptable answers, including

$$1=\frac{1}{y}+\frac{1}{x}$$

   (b) The point of intersection is $(5/4, 5)$.

   (c) Two polar representations of the point in (b), one with a positive and one with a negative r, are

$$\left(\frac{5\sqrt{17}}{4}, \tan^{-1} 4\right) \text{ and } \left(-\frac{5\sqrt{17}}{4}, \pi+\tan^{-1} 4\right)$$

3. The curvature when $t=-1$ is

$$\kappa=\frac{\sqrt{19}}{7^{3/2}\sqrt{2}}.$$

4. (a) The line is

$$x=e^2+e^2t,\ y=e^{-2}-e^{-2}t,\ z=\ln 2+\frac{1}{2}t.$$

   (b) The line in (a) intersects the yz-plane at the point

$$\left(0, 2e^{-2}, \ln 2-\frac{1}{2}\right).$$

5. The area of the triangle is $\frac{1}{2}\sqrt{14}$.