Math 251
Answers for Practice Test 1b

1. [10 points] See textbook page 560.

2. [10 points] 1.

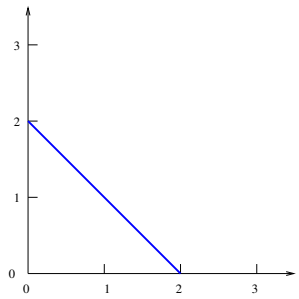
3. [10 points] $16/\sqrt{14} = \frac{8\sqrt{14}}{7} \approx 4.276$.

4. [5 points]

   a. For $y = 0$ we get $4x^2 + 12z^2 = -12$. But the left hand side is never negative. Thus, the graph is empty.

   b. A two sheeted hyperboloid.

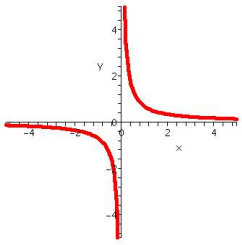
5. [10 points] Since $x + y = 2$ the graph is this line, but $x(t)$ and $y(t)$ are restricted to be in [0,2].



6. [10 points] $\displaystyle\int_0^{10} \sqrt{t^2 + t^4/4 + e^{2t} - 2e^t + 1}\, dt$.

7. [10 points] $f_{xz} = f_{zx} = -y\sin(xyz) + xy^2 z\cos(xyz) + 2xy^3 e^z$.

8. [10 points] For $z = 0$ the graph is empty. For $z = 1$ the graph is the x and y axes since we have $xy = \ln 1 = 0$. For $z = 2$ we get the hyperbola shown below.



9. [10 points] Let $\mathbf{v} = \langle 7, 2, 1\rangle - \langle 1, -2, 3\rangle = \langle 6, 4, -2\rangle$ and $\mathbf{r}_0 = \langle 7, 2, 1\rangle$. Then use

$$\mathbf{r}(t) = \mathbf{v}t + \mathbf{r}_0 = \langle 6t + 7, 4t + 2, -2t + 1\rangle\,.$$

   Other valid answers exist.

10. [10 points] Let $x(t) = 4\cos t$ and $y = 4\sin t$. Then set $z(t) = 5 - x(t) = 5 - 4\cos t$. Thus we have

$$\mathbf{r}(t) = \langle 4\cos t, 4\sin t, 5 - 4\cos t\rangle\,.$$

    Other valid answers exist.