Math 215 Homework 5 (do by 1/20/09, turn in on 1/22/09)

Read 7.3 for 1/20

1 To turn in

Problem 1 7.2 number 24

Problem 2 Solve the following system of equations:
\[ \begin{align*}
x + 2y &= 4 \\
x - y &= 1
\end{align*} \]

Problem 3 Find all solutions to the following system of equations:
\[ \begin{align*}
(x + 1)^2 + y &= 0 \\
2x - y &= 2
\end{align*} \]

Problem 4 Find all solutions to the following system of equations:
\[ \begin{align*}
x(x + 2y - 1) &= 0 \\
(y + 2)(y + 3) &= 0
\end{align*} \]

Problem 5 Find all solutions to the following system of equations:
\[ \begin{align*}
x^2/y^2 &= 8y/x \\
x^2 + y^2 &= 10
\end{align*} \]

Problem 6 Find the first order partial derivatives of
\[ p(V, n, T) = \frac{nRT}{V} \]
where R is a constant.

Problem 7 The production \( P \) of a factory depends on two factors: capital \( (K) \) and labor \( (L) \). The formula for production is
\[ P(K, L) = 3.4K^4L^6 \]

Find the equations for \( \frac{\partial P}{\partial K} \) and \( \frac{\partial P}{\partial L} \). Then say in words what each describes.

Problem 8 The cost \( C \) of a stereo system depends on two factors: the quality \( q \) of the sound and the recognizability \( r \) of the company name. Describe in words the meaning of
\[ \frac{\partial C}{\partial q}(40, 0.63) = 200. \]
Problem 9  Find $f_{xy}$ and $f_{yx}$ and show they are the same.

\[ f(x, y) = x^5y^7 + x^3 \]

Problem 10  Find all second-order partial derivatives of

\[ f(x, y) = 3x^3y^9 \]

Problem 11  Find all second-order partial derivatives of

\[ g(x, y) = e^{xy} \]