

Mathematics 1070

Print Name: \_\_\_\_\_

Problem Set

Due Wednesday, December 3, 2008

Signature: \_\_\_\_\_

Your signature is your pledge that you have adhered to the guidelines for problem sets and take-home examinations.

For those students who submit this problem set, it will count as much as a regular exam.

Make sure that you check the course website for instructions. Remember that your paper may be handed in before the deadline but that no late papers will be accepted regardless of the reason.

This problem set is *optional* for those students who have not missed any other exams or problem sets. If it is submitted by the due date, it will be graded and used to compute your average. If you have submitted the other exams and problem sets but this is not submitted, your average will be calculated based on your other grades and there will be no penalty for not submitting this problem set.

Note that, since most of the calculations involved can be done routinely using either a calculator or a symbolic manipulation program such as Maple or Mathematica, it will obviously be necessary to show, through your work, exactly how you came up with your solutions.

*If this problem set is submitted by the next to the last class of the semester, every effort will be made to have it graded and returned at the last class.*

1. A seven card rummy hand is dealt. Let  $A$  be the event that the hand contains either 3 of a kind (3 cards with the same face value) or 4 of a kind. Let  $B$  be the event that the hand contains 3 of one kind and 4 of another kind. Find  $P(B|A)$ .
2. A loan is to be paid off in monthly installments of \$275 each over a period of five years. Assuming an annual interest rate of 7 percent, what is the amount of the loan? (Assume interest on the prior balance is calculated at the same time a payment is made. Your conclusion, which should be a statement in plain English, may involve rounding off the amount of the loan to the nearest cent, but you should show any calculations with as much accuracy as your calculator displays.)
3. Sketch the feasible set for the following system of inequalities.

$$x - y \leq 3$$

$$x \leq 2$$

$$x \geq 0, y \geq 0$$

4. Perform the indicated elementary row operation on the matrix  $\begin{pmatrix} 5 & 3 & -2 & 7 \\ -2 & 5 & 1 & 8 \\ 3 & -2 & 6 & 11 \end{pmatrix}$ :

Subtract 4 times the third row from the second row.

5. Pivot about the second row, second column of the matrix  $\begin{pmatrix} 4 & 2 & 2 \\ -1 & -3 & 4 \\ 3 & -1 & 6 \end{pmatrix}$ . *Your arithmetic should be exact.*
6. Solve the following systems of equations by setting up an augmented matrix, using Gaussian Elimination on that matrix and interpreting the result.

$$\begin{aligned}x + 2y + z &= -2 \\ -2x - 3y - z &= 1 \\ 2x + 4y + 2z &= -4\end{aligned}$$

(7-9): Consider the following linear programming problem.

Maximize  $P = 2x + 5y$  subject to

$$\begin{aligned}2x + y &\leq 16 \\ 2x + 3y &\leq 24 \\ y &\leq 6 \\ x \geq 0, y &\geq 0\end{aligned}$$

7. Solve the linear programming problem geometrically.
8. Set up the initial simplex tableau for the linear programming problem.
9. Solve the linear programming problem using the simplex method.

### Extra Credit

Extra credit will be awarded for the best joke. All jokes must observe standards of good taste.