FINAL EXAM - MATH 111

Wednesday, December 18, 2002

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Read each problem very carefully before starting to solve it. Each question is worth 4 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

- 1. Find the point of intersection of the line that goes through the points (0,2) and (2,1) and of the line that is perpendicular to it and goes through (2,5).
- 2. Find the domain of the function $f(x) = \sqrt{-x^2 + 7x 10}$.
- 3. Find the vertex, the opening direction, the x- and y-intercepts and sketch the graph of $f(x) = -3x^2 + 6x$.
- 4. Find the equation of the parabola that has vertex V = (4, -1) and goes through the point (0, -2).
- 5. Solve the equations
 - (a) $3^{x^2-9} = 81^{2x}$. (b) $\log_2(x+5) - \log_2(x-1) = 2$.
- 6. Solve the following system by the Gauss-Jordan method

- 7. An urn contains 5 red, 3 black, 7 white and 2 green marbles. Two marbles are drawn at random without replacement. Find the probability of
 - (a) the first marble being white and the second being green,
 - (b) one marble being black and one red.

- 8. In a U.S. state, 20% of the population lives in inner cities, 35% in suburbs and 45% in rural areas. 20% of those living in inner cities receive poor medical care and the corresponding probabilities for those living in the suburbs and in rural areas are 5% and 10%, respectively. A person in the population selected at random receives poor medical care. What is the probability that he came from the suburbs?
- 9. A committee of the United Nations consists of 6 Chinese, 5 Indian, 3 American, 2 Canadian and 4 European members.
 - (a) A subcommittee of 5 is to be formed on Asian affairs. In how many ways can such a subcommittee be formed if it is to consist of at least 4 Asian members?
 - (b) A subcommittee of 8 is to be formed consisting of a Chairman, a Vice-Chairman, two Secretaries and 4 members. In how many ways can such a subcommittee be formed?
- 10. A pair of fair dice are rolled 9 times. Find the probabilities that
 - (a) sum 8 appears at least once.
 - (b) sum 10 appears at most twice.