FINAL EXAM - MATH 111

Tuesday, April 29, 2003
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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 equation of the line that goes through the point $(-5, 2)$ and is perpendicular to the line going through $(1, 2)$ and $(4, 3)$.

2. Find the domain of the function $f(x) = \frac{1}{\sqrt{x^2-2x-8}}$.

3. A shopping center has a rectangular area of 40,000 square yards enclosed on three sides for a parking lot. The length is 200 yards more than twice the width. Find the length and width of the lot.

4. Find the vertex, the opening direction, the x- and y-intercepts and sketch the graph of $f(x) = 4x^2 - 12x - 7$.

5. Solve the equations

   (a) $e^{3x-1} = 12$.

   (b) $2\ln(y+1) = \ln(y^2-1) + \ln 5$.

6. Solve the following system **by the Gauss-Jordan method**

$$\left\{\begin{array}{rcrcrcr} x & + & y & - & z & = & 6 \\ 2x & - & y & + & z & = & -9 \\ x & - & 2y & + & 3z & = & 1 \end{array}\right\}.$$

7. On a typical January day in Manhattan the probability of snow is 0.10, the probability of a traffic jam is 0.80 and the probability of snow or of a traffic jam is 0.82. Are these two events independent?

8. During the Iraq war 40% of the population of a certain American city were following the news on CNN, 25% on Fox and the remaining 35% on Public television. Of the CNN viewers 60% were opposed to

the war without a second UN resolution, whereas the corresponding percentages for Fox and Public TV were 20% and 75%, respectively. If a viewer in that city is selected at random and is found to support the war without a second UN resolution, what is the probability that he/she followed the news on CNN?

9. A car dealer has 8 red, 11 gray and 9 blue cars in stock. Ten cars are randomly chosen to be displayed in front of the dealership. Find the probability that

   (a) 4 are red and the others are blue.

   (b) at most one is gray and none are blue.

10. The probability that a certain machine turns out a defective item is 0.05. What is the probability that in a run of 75 items

    (a) exactly 5 defectives are produced.

    (b) at least 2 defectives are produced.