MATH 145

Test 3

8 December 2003

Name: ______________________________

Evaluate the integral (5 points):

- $\int_{-4}^{2} |x+2|dx$ (use next page)

and do any 3 of the following problems (15 points each):

1. Two circles, S and T, and a point A are given. Find points B on S and C on T such that $\triangle ABC$ is isosceles with $AB = AC$, $\angle ABC = \angle ACB = 75°$, and $\angle BAC = 30°$. Assume that a solution exists.
2. Find integer numbers a and b such that $6 = 67a + 25b$.
3. Two players play the following game.
   - Turns alternate.
   - At each turn, a player removes either 1 or 2 counters from a pile that had initially 10 counters.
   - The game ends when all counters have been removed.
   - The player who takes the last counter loses.

   Find a winning strategy for one of the players.
4. The parabola $y = x^2 + 2$ has two tangent lines that pass through the origin. Find their equations.

- **Extra credit** (15 points): Two lines, p and q, and a point A are given. Find points B on p and C on q such that $\triangle ABC$ is isosceles with $AB = BC$, and $\angle ABC = 90°$. Assume that a solution exists.

- Evaluate the integral: $\int_{-4}^{2} |x + 2| dx =$

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