COT 3100 Quiz #2 (Version A): d = rt, Integer Factorization, Arith/Geo Series, Counting, Probability

4/7/2025, 4/8/2025

Circle Your Recitation Day/Time: **M 8:00 am** **T 8:00 am** **T 9:00 am** **T 10:30 am**

Last Name: _____ **First Name: _____**

1) (10 pts) Positive integers x and y with $x > y > 0$ satisfy $x + y + xy = 220$. What are both x and y equal to? (Note: no credit will be given for the correct answer using the guess and check method. All points will be awarded for the method shown in the recitation notes for solving problems of this nature.)

x = _____ y = _____

2) (10 pts) Let a_1, a_2, a_3, …, a_{100} be an arithmetic sequence with a common difference of 2. If the sum of the whole series (all 100 terms) is 444, what is the sum $\sum_{i=1}^{50} a_{2i-1}$? (Note: There's a faster and easier way to do this than determining the value of a_1.)

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3) (10 pts) An infinite geometric series has sum of 12. If the first term of the sequence is six times the common ratio of the sequence, what are the values of the first term and common ratio of the sequence?

a_1 = _____ r = _____

4) (10 pts) Sammy writes down the positive integers in order starting from 1. What is the 40,004th digit that she writes down? **For full credit, you must specify which digit (ones, tens, hundreds, etc.) this digit is and what number this digit is a part of.** (Credit is only given for the work and not the final answer.)

5) (10 pts) James rolls a fair standard six-sided die. If he rolls a 1 or 2, he'll pick a prize at random from bag A. Otherwise, he'll pick a prize at random from bag B. Bag A has 100 prizes, of which 20 are worth over $1000. Bag B has 40 prizes, of which 30 are worth over $1000. What is the probability that James will get a prize worth over $1000? **Please express your answer as a fraction in lowest terms.**

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Place any other work you would like graded below. Clearly mark which question(s) the work is for.