Ma2201/CS2022   # Discrete Mathematics   A Term, MMXVII
Quiz 0001   Print Name: _____
                                             Sign: _____

1. (**2 points**) A worcester man wants to plan a vacation. His travel destination is either Bermuda, Barbados, or Boston, and he can travel by Amtrack, Jet Blue, or Caribbean Air. Circle *each* of the following which is true.

   a) There are $3 \cdot 3 = 9$ scenarios by the multiplicative principle.

   b) The choices of destination and carrier are independent.

♣ *b is not true. Boston is not in the Caribbean so getting a flight to Boston on Caribbean Air seems unlikely, and what is more, you certainly cannot travel from Worcester to Bermuda by train, so Amtrack is out. Hence the choices of destination and carrier are not independent. So the multiplicative principle does not apply and a is not true either. Neither should be circled.* ♣

2. (**6 points**) How many numbers between one million to two million have the last three digits odd, (like 1,256,335)?

   Justify your answer.

Two million, $2,000,000,$ *has last digit even so we can assume that the first digit is a 1. The next three digits each have 10 possibilities, and the last three have 5 possibilities. The seven choices are all independent, so there are* $1 \cdot 10 \cdot 10 \cdot 10 \cdot 5 \cdot 5 \cdot 5 = 10^3 \cdot 5^3 = 125,000$ *such numbers*

3. (**2 pts**) Order the following games from most to least discrete: tug-of-war, checkers, and darts.

♣ *Most discrete is checkers, where you take turns and at each turn there are just a few possible moves. Next is darts, where you take turns, and there are a few particular targets and scores, but the throwing of the dart itself is a continuous action.*

Least discrete would be tug-of-war, where each player has a continuous range of actions at any time. It is true you can win or lose tug-of-war, but that is true of all three games. ♣