MAT 258 Quiz 2 Answer Sheet

May 22, 2023

Quiz ID: MVX Name: _____

1. ☐
2. ☐
3. ☐
4. ☐
5. ☐
6. ☐
7. ☐
8. ☐

Submit electronic answers at

http://azrael.digipen.edu/cgi-bin/MAT258quiz.pl

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MAT 258 **Quiz 2** May 22, 2023

1. How many bit strings of length 7 contain both of the substrings 0110 and 1001 ?
   a) 12 b) 10 c) 16 d) 8 e) 6

2. A task consists of lining up 6 people from left to right and then placing a penny, a nickel, a dime, and a quarter into the left or right pocket of 4 of these 6 people. In the end there will be exactly one coin in exactly one pocket of exactly 4 of the 6 people, who are standing in order from left to right. In how many different ways can this task be performed?
   a) $(6!)^2 2^3$ b) $(6!)^2 4!$ c) $(6!)^2 2^4$ d) $(6!4!)^2$ e) $(6!2^4)^2$

3. How many strings of length 7 are there, whose characters are chosen from the digits 0,1, and 2, if each digit occurs at least twice?
   a) 600 b) 630 c) 720 d) 500 e) 520

4. How many different functions are there from $X = \{1, 2, 3, 4\}$ to $Y = \{5, 6, 7\}$?
   a) 84 b) 80 c) 89 d) 81 e) 85

5. How many different surjective (onto) functions are there from $X = \{1, 2, 3, 4\}$ to $Y = \{5, 6, 7\}$?
   a) 56 b) 80 c) 30 d) 45 e) 36

6. How many solutions does the equation $x_1 + x_2 + x_3 + x_4 + x_5 = 7$ have with integers $x_i \geq 0$?
   a) 330 b) 104 c) 384 d) 500 e) 424

7. How many solutions does the equation $x_1 + x_2 + x_3 + x_4 + x_5 = 7$ have with integers $x_i \geq 0$ and assuming that each $x_i \leq 2$? (Hint: first think of how many x_i must equal 2.)
   a) 40 b) 24 c) 30 d) 64 e) 84

8. What is the cardinality of $A \cup B \cup C$ if A and B are disjoint, $|A \cap C| = 4$, $|B \cap C| = 6$, and $|A| = |B| = |C| = 10$?
   a) 30 b) 18 c) 20 d) 28 e) 24