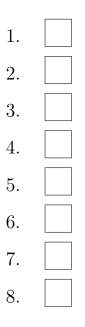
MAT 258 Quiz 2 Answer Sheet

May 22, 2023

Quiz ID: QDC

Name: \_\_\_\_\_



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## MAT 258 Quiz 2

1. How many bit strings of length 7 contain both of the substrings 0110 and 1001 ?

- a) 6 b) 8 c) 10 d) 16 e) 12
- 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)  $(6!2^4)^2$  b)  $(6!4!)^2$  c)  $(6!)^2 4!$  d)  $(6!)^2 2^4$  e)  $(6!)^2 2^3$
- 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) 520 b) 500 c) 630 d) 720 e) 600

- 4. How many different functions are there from  $X = \{1, 2, 3, 4\}$  to  $Y = \{5, 6, 7\}$ ? a) 85 b) 81 c) 80 d) 89 e) 84
- 5. How many different surjective (onto) functions are there from  $X = \{1, 2, 3, 4\}$  to  $Y = \{5, 6, 7\}$ ? a) 36 b) 45 c) 80 d) 30 e) 56
- 6. How many solutions does the equation  $x_1 + x_2 + x_3 + x_4 + x_5 = 7$  have with integers  $x_i \ge 0$ ? a) 424 b) 500 c) 104 d) 384 e) 330
- 7. How many solutions does the equation  $x_1 + x_2 + x_3 + x_4 + x_5 = 7$  have with integers  $x_i \ge 0$  and assuming that each  $x_i \le 2$ ? (Hint: first think of how many  $x_i$  must equal 2.) a) 84 b) 64 c) 24 d) 30 e) 40
- 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) 24 b) 28 c) 18 d) 20 e) 30