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5.1 Basic Counting Rules

CS 225

7th edition: { 8, 12, 16, 26, 28, 48, 52, 72}

8) 26 \* 25 \* 24 = 15,600 initials

12) 20 + 21 + 22 + 23 + 24 + 25 + 26 = 127

16) case 1: 1 'x' in the string. 4\*25\*25\*25 = 62500

case 2: 2 'x's in the string: 6\*25\*25 = 3750

case 3: 3 x's in the string: 4\*25 = 100

case 4: 4 x's means there is only one string for that.

cases 1 +2 + 3 +4 = 66,351 combinations

26) a) 10\*9\*8\*7 = 5040 distinct strings

b) 5\* 103 = 5000 even ending strings

c) 9\*4 = 36 choices

28) 10\*10\*10\*26\*26\*26\*2 = 35,152,000 license plates

48) case 1: two 0's start; 25 = 32 ways

case 2: ends with three 1's; 24 = 16 ways

case 3: starts two 0's ends with 3 1's: 22 = 4

case 1 + 2 + 3 = 44

52) 38 + 23 - 7 = 54 students total

72) let P(m) be the product rule for m tasks.

basis: m = 2, P(2) is true. if there are n1 ways to do the first task, and n2 ways to do the second, then n1n2 ways possible exists for the procedure.

inductive step: P(k) is true for the inductive hypothesis, where k is an integer greater than 2. if k+1 tasks, T1, T2 ... Tk+1 can be done in n1,n­22, ... nk+1 ways, so that it can be done separately. To finish all of these tasks, the first k tasks is (n1n2 .. nk) \* nk+1 to finish the entire tasks.