CSC 2510, FALL 2007
EXAM 2 PRACTICE PROBLEMS SOLUTIONS

4. Let A = parts with paint defect
   B = parts with packaging defect
   C = parts with electronic defect
   Then $|A| = 28$, $|B| - 17$, $|C| = 13$, $|A \cap B| = 6$, $|B \cap C| = 7$, $|A \cap C| = 10$.
   $40 = 28 + 17 + 13 - 6 - 7 - 10 + |A \cap B \cap C|$, so $|A \cap B \cap C| = 5$; 5 parts had all three types of defect.

8. Let A = checking account set, B = regular savings set, C = money market savings set.
   a. $|A \cap C| = 93$.
   b. $|A - (B \cup C)| = |A| - |A \cap (B \cup C)|$ by Example 29
      $= |A| - |(A \cap B) \cup (A \cap C)|$
      $= |A| - (|A \cap B| + |A \cap C|)$ by Example 28 because $(A \cap B)$ and $(A \cap C)$ are disjoint
      $= 189 - (69 + 93) = 27$

17. 5 (Use the Pigeonhole Principle, where suits are bins, cards are items)

21. 3; there are two genders (bins).

26. This follows from the Pigeonhole Principle, where the n possible remainders (the numbers 0 through n - 1) are the bins.

9. 19!

17. C(18, 11)

39. C(32, 14)

41. C(43, 14)

65. $\dfrac{12!}{5!3!4!}$

72. a. C(10, 8)
    b. C(7, 5) (3 of the 8 objects are fixed, choose the remaining 5 from among 3, with repetitions)
    c. C(9, 8) (choose 8 from 2 with repetitions)
    d. C(8, 6) (2 of the 8 objects are fixed, choose the remaining 6 from among 3, with repetitions)
    e. C(9, 8) + C(8, 7) + C(7, 6) (zero chocolate chip cookies used - choose 8 from 2 with repetitions) + (one chocolate chip cookie used - choose remaining 7 from among 2 with repetitions) + (two chocolate chip cookies used - choose remaining 6 from among 2 with repetitions)

7. $729x^6$

16. From the Binomial Theorem with a = 1, b = (-1):
$C(n, 0) - C(n,1) + C(n,2) - \ldots + (-1)^n C(n,n) = (1 + (-1))^n = 0^n = 0$