**STAT 341** Homework 4 Solutions

**1.** 9!

**2.** $4 \cdot 3 \cdot 5 = 60$

**3.** $P_{16,3} = 16 \cdot 15 \cdot 14$

**4.** $C_{30,5}$

**5.** $P_{10,6}$ if order is important, and $C_{10,6}$ if order is not important.

**6.** We need to determine the number of pairs that can be formed when the order is not important. Hence, the answer is $C_{5,2}$.

**8.** $C_{19,7}$

**9a.** $26^3 10^3 = 260^3$

**9b.** The number of ways that the letters and numbers are the different is can be counted using the multiplication rule. This leads to the probability $(26 \cdot 23 \cdot 22 \cdot 10 \cdot 9 \cdot 8)/(26^3 10^3) \approx 0.6325$.

**11.** Order matters with phone numbers, and so there are 10!/3! that are all different. The probability that all are different is $10!/(3!10^7) \approx 0.06048$.

**14.** 5!6!

**18.** money: $5!/(1!1!1!1!1!) = 5!$; banana: $6!/(1!3!2!)$; statistics: $10!/(3!3!1!2!1!)$; mississippi: $11!/(1!4!4!2!)$.

**19.** $12!/(4!4!4!)$

**21.** First, consider getting 2 ones, and 2,3,4,5 and 6. This can happen $7!/(2!1!1!1!1!1!)$ ways, and this event corresponds to observing at least one of each number. Since we may also get 2 twos or 2 threes, and so on, there are $(6 \cdot 7!)/2 = 3 \cdot 7!$ ways the event can happen. The probability is $(3 \cdot 7!)/6^7 \approx 0.054012$.

**23.** It's easier to count permutations for this problem. There are 3! choices for first place, 2! for second, 3! for third, 1 choice for fourth, and 2! and 1 for fifth and sixth. Hence, the probability is $3!2!3!2!/6! = 1/20$