- Due by 1559 AST Friday, January 14, 2011
- Show your work

1. What is the probability of drawing, from a standard deck of cards:
   (a) the queen of spades or the ace of hearts;
   (b) a red face card;
   (c) an even-numbered card.
2. Consider rolling two dice, compute the probability of (a) the dice showing the same number and (b) the numbers on the dice summing to 7. (c) Explain why are the answers to (a) and (b) the same? (Hint: Consider rolling one die first, seeing the result, and then rolling the second die.)
3. (a) List the ways 4 coins be flipped, resulting in 2 heads and 2 tails?
   (b) What is the probability of flipping a coin 5 times consecutively and receiving 4 heads and then tails?
4. (a) January 1, 2011 was a Saturday. How many Saturdays will there be this year? (b) How many leap years have there been from 1949 to 2011?
5. (a) If $2^{37} + 2^{38} + \cdots + 2^{82} = \sum_{i=1}^{n} 2^{i+k}$ then what are n and k?
   (b) What is the 13th element of the list 21, 22, 23,. . . ,100?
6. Draw a tree to count the number of ways a *best-of-3* (race to 2) series can be won.
   (a) How many ways can the series play out between the two teams?
   (b) Using the multiplication rule, how many ways are there to complete a best-of-5 if each team wins one of the first 2 games?
7. (a) Compute P(6,3).
   (b) What is P(n,n) - P(n,$n-1$) for $n \geq 2$?
   (c) I own 2 novels, 100 math books, and 5 non-fiction books. How many ways can I pick one of each kind to take with me on my upcoming trip?
8. (a) How many divisors does 12 have?
   (b) How many divisors does $2^7 3^3 5^4$ have?