Probability
Application Questions

1. Use Pascal's Triangle to determine the probability of:
   a. Getting exactly four heads with 6 coin tosses?

   Total= 2^6=64

   Fourth element in the sixth row is 15

   15/64=23.4%

   b. Getting exactly one tail with 5 coin tosses?

   Total= = 2^5=32

   Fourth element in the fifth row is 5. (exactly one tail is same as exactly four heads)

   5/32=15.6%

   c. Getting at least two heads with 4 coin tosses?

   Total= = 2^4=16

   Need both the second, third and fourth elements added together. 6+4+1=11

   11/16=68.8%

2. A teacher has 12 students in a class and wants to divide the class into groups. Use Pascal's Triangle to determine:
   a. How many different groups of two can there be?

   66-second element in the twelfth row

   b. How many different groups of three can there be?

   220-third element in the twelfth row

   c. How many different groups of four can there be?

   495-fourth element in the twelfth row

3. List the different outcomes possible in an experiment where a coin is flipped and dice is rolled. What is the total number of possible outcomes? Is it possible to determine the total number of possible outcomes mathematically?

   H1,H2,H3,H4,H5,H6,T1,T2,T3,T4,T5,T6

   Total number of possible outcomes is 12.

   2x6=12 (two outcomes for flipping coin multiplied by six outcomes for rolling a dice)

4. A jeweler makes necklaces using three precious stones.
   a. How many different kinds of necklaces could the jeweler make if he has three pearls, four rubies, five emeralds and two sapphires?
   3+4+5+2=14 precious stones in total to choose from
   Pascal's triangle third element in the fourteenth row is 364

   b. What is the probability of the jeweler making a necklace which only has either pearls or sapphires? (Hint: Think of there being only two possible outcomes and use Pascal's Triangle.) *pearls and sapphires together is five*
   Total possible outcomes is $2^{14}=16384$
   Fifth element in fourteenth row is 2002
   2002/16384=12.2%