Math 320 Section 2
Quiz 4 Key Winter 2014

1. A fair coin is tossed twice. Find the probability for each of the following:
   (a) Exactly one tail.
   *Solution.* If $T$ stands for "tail" and $H$ for "head", then the set of all outcomes is $\{TT, TH, HT, HH\}$. The event "Exactly one tail" is the set $\{TH, HT\}$. Thus, the probability of this event is
   $$\frac{\text{number of event outcomes}}{\text{total number of outcomes}} = \frac{2}{4} = \frac{1}{2}.$$
   (b) At least one tail.
   *Solution.* If $T$ stands for "tail" and $H$ for "head", then the set of all outcomes is $\{TT, TH, HT, HH\}$. The event "At least one tail" is the set $\{TT, TH, HT\}$. Thus, the probability of this event is
   $$\frac{\text{number of event outcomes}}{\text{total number of outcomes}} = \frac{3}{4}.$$
   (c) Not two heads.
   *Solution.* If $T$ stands for "tail" and $H$ for "head", then the set of all outcomes is $\{TT, TH, HT, HH\}$. The event "Not two heads" is the set $\{TT, TH, HT\}$. Thus, the probability of this event is
   $$\frac{\text{number of event outcomes}}{\text{total number of outcomes}} = \frac{3}{4}.$$
2. In Sentinel High School, there are 350 freshmen, 320 sophomores, 310 juniors, and 400 seniors. If a student is chosen at random from the student body to represent the school, what is the probability of the event that the chosen student is a freshman?
   *Solution.* The number of students is $350+320+310+400 = 1380$. The event "choose a freshman" has probability
   $$\frac{\text{number of freshmen}}{\text{total number of students}} = \frac{350}{1380} = \frac{35}{138}.$$
3. Use the random generated sequence 284567 to model the number of sons and daughters of a family with six children. Remember that the probability of having a son is the same as the probability of having a daughter. Two possibilities.
   *Solution.* Let the digits 0, 1, 2, 3, 4 represent the event "son" and 5, 6, 7, 8, 9 represent the event "daughter". Then 284567 will stand for SDSDDD, which means two sons and four daughters. It can also be two daughters and four sons. Other possibilities could be odd = son (daughter) and even = daughter (son).
4. 2 Points. How long is the Kern river?
   *Solution.* 165 miles = 270 kms
5. 2 Points. Who was the US President on September 11, 2001?
   *Solution.* G. W. Bush.