1. How long does it take a packet of length 1000 bytes to propagate over a link distance of 2500 km, propagation speed (*s*) of 2.5x10^8m/s, and transmission rate of 2mbps?

The discussion for this begins on p.36 of the book. Look at the caravan analogy.

Transmission = 1000 / 250000 = .004 seconds (remember B vs b)
Propagation = 2500km / 2.5x10^8meters/sec = 0.01 seconds
Total = 0.014 sec

2. Suppose users share a 2Mbps link. Also suppose each user transmits continuously at 1Mbps when transmitting, but each user transmits only 20% of the time.

The discussion begins on p.30

   a. When circuit switching is used, how many users can be supported?
      2 users for circuits as we have to reserve 1Mbs for each user even though they waste it 80% of the time.
   b. When packet switching is used, how many users can be supported?
      This goes deeper into probability than we really need to go, so the short answer is <u>a lot more.</u>
   c. What is the probability a given user is transmitting at any time?
      This was really going for something else, but the probability a given user is transmitting at any time is 20% (it says so in the question.) The probability that a given user is the only one transmitting is different. If we assume a fixed, larger number of users, we can calculate the probability that all of them are transmitting at once pretty easily, but to calculate that some number greater than the capacity of the link are transmitting at the same time we need some additional probability.
      WE WILL NOT BE ASKING THIS!

3. Suppose you have a 1Gbps link and two hosts separated on this link at 100ms RTT. How much data (in Bytes) will need to be "in-flight" to achieve full utilization using TCP as a transport?

Discussion on p.219

125MB/sec link * 0.1 seconds propagation time = 12.5MB/sec data in flight