Problem 1. *Write each one as a decimal, as a percent (%), and as parts per million (ppm):*

(a) 1/5

(b) 0.0023

(c) 1/3

(d) 13%

(e) 2ppm

Problem 2. *Which is bigger? (no calculators!)*

(a) One in eight chance, or 12% chance?

(b) A 15% discount on a $150 purchase, or a $20 coupon (for the same purchase)?

(c) A $1 tip on a $9 meal, or a 17% tip on the same meal?

Problem 3. *In a city of* 100,000 *people, there are* 200 *werewolves. You have developed a werewolf test that successfully identifies a werewolf* 95% *of the time. It also has a false-positive rate of* 1%. *You test the entire population for being werewolves — the sheriff wants to kill all the werewolves.*

(a) What percentage of the population are the werewolves?

(b) If you randomly pick 1,000 *people, how many of them will probably be werewolves?*

(c) How many non-werewolves did you (problably) diagnose as being werewolves? How many were (problably) told that they are healthy?

(d) How many werewolves did you (problably) diagnose as being werewolves? How many were (problably) told that they are healthy?

(e) If you kill all the supposed werewolves, how many people die?

(f) On second thought, you remember that all werewolves have long hair. If there are 10,000 *people with long hair in the city, and you only test these people, how do the answers to* (c) − (e) *change?*

Problem 4. *You have 10 balls in a bag: 3 blue and striped, 2 blue and solid, 4 green and striped, 1 green and solid. Compute the following:*

(a) What are the chances of randomly picking a blue ball?

(b) What are the chances of randomly picking a striped ball?

(c) What are the chances of randomly picking a ball that is neither blue nor striped?

(d) What are the chances of randomly picking a blue ball twice in a row?

(e) Suppose you randomly draw a striped ball. What are the chances it is blue?

(f) Suppose you randomly draw a blue ball. What are the chances it is striped?