Probability Exercise (Section 8.1)   NAMES:

These are selected questions (numbers copied from book) from Set II of the exercise set. Turn in one paper per group but be sure all members of the group have seen the final answers. Circle your name if the paper that gets turned in is your copy.

Suppose that an ordinary coin is tossed. If it is assumed that the outcomes of heads and tails are equally likely, then the probability of it turning up heads is $\frac{1}{2}$ or .5 [or 50%. This is called **theoretical probability**.]

1. By this reasoning, what is the probability of a coin turning up tails?

An English mathematician being held prisoner during World War II tossed a coin 10,000 times. The coin turned up heads 5,067 times.

2. Use these numbers to calculate the probability of the coin turning up heads. [This is called **experimental probability**.]

3. By the same method, what is the probability of the coin turning up tails?

Suppose that the probability of a certain coin turning up heads is 1.

4. What would you conclude about the coin? [In other words, is it a normal coin?]

If someone in New York City is treated in an emergency room for a bite, the probability that the person was bitten by a dog is $\frac{9}{10}$.

5. Express this probability as a percentage. [To do this, divide the fraction as indicated and multiply by 100. Attach a percent sign to your answer.]

The probability of a person being bitten by a cat is $\frac{1}{20}$.

6. Express this as a percentage.

The probability that the person was bitten by another person is $\frac{1}{25}$.

7. Express this as a percentage.

8. Do the three percentages that you have just determined add up to 100%?

9. Do you think they should? Explain.

An American roulette wheel has 38 compartments around its rim. Two of these are numbered 0 and 00 and are green; the others are numbered 1 through 36, of which half are red and half are black. [A picture is attached at the end of this worksheet.]

When the roulette wheel is spun in one direction, a small ivory ball is rolled in the opposite direction along its rim. If the wheel is fair, the chances of the ball falling into any one of the 38 compartments as it slows down are equally likely.

Some typical bets in roulette are listed below. Express the probability of winning each bet as a fraction and as a percentage.

10. The number 7

11. A black number

12. An odd number

13. [Any one of] the numbers 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, and 36 (called a "column" bet)

14. [Either one of] two adjoining numbers (called a "split" bet)

15. A red number, if all 26 numbers that had come up previously were black

16. Which one of these bets has the biggest payoff? Why?

Roulette wheel

Summary: 38 total spaces: 2 green, 18 black, 18 red