EXERCISES

1. Identify five random phenomena that occur in your life.

2. Random phenomena can't be predicted for certain in the short term, but exhibit regular patterns in the long term. Which of the data sets in (a – d) do not appear to be from the random phenomena of coin tossing? Explain.

a. T T T T T T T T T T T T T T T T T T T T

b. H H T H H T T H H H H T H T H H T T T T H H H H

c. H T H T H T H T H T H T H T H T H T H T H T H T

d. T H H T T H H T T H H T T H H T T H H T T H H T

3. In a class experiment, 20 students each flipped a coin 50 times. Their results appear in Table 18.1.

Student	1	2	3	4	5	6	7	8	9	10
Number Heads	27	27	27	28	27	28	20	24	19	28
Student	11	12	13	14	15	16	17	18	19	20
Number Heads	22	28	21	26	21	26	25	25	28	24

Table 18.1. Results from flipping coin 50 times.

a. Table 18.2 presents the cumulative results of the student data from Table 18.1 – starting with student 1, next combining the results from students 1 and 2, next combining the results from students 1, 2, and 3 and so forth. Make a copy of Table 18.2 and complete the table. Round proportions to three decimals.

Number Flips	Number Heads	Proportion	Number Flips	Number Heads	Proportion
50	27	0.540	550		
100	54	0.540	600		
150	81		650		
200			700		
250			750		
300			800		
350			850		
400			900		
450			950		
500			1000		

Table 18.2. Cumulative results of student coin flipping data.

b. Plot the proportion (vertical axis) versus the number of flips (horizontal axis). Connect the points with line segments. The long run proportion of heads for a fair coin is 0.5. Add a horizontal line at 0.5.

c. Based on the plot you drew for (b), do you think that the coin used to produce the data in Table 18.1 was a fair coin? Explain.

4. Assess the probabilities of the following outcomes. Decide if the probability that the outcome will occur is low (between 0 and 1/3), moderate (between 1/3 and 2/3), or high (between 2/3 and 1). Justify your answers.

a. Alex is in a class of 20 students. For each class, the instructor selects 3 students to put homework on the board. To make the selection random, the instructor places the names of the students in a container, mixes them, and then asks a student to draw three names. Alex is unprepared. Assess the chances that he will be called.

b. It is cloudy outside and quite humid and warm. The temperature is expected to drop as even more clouds roll in. Assess the chances for rain.

c. After shuffling a standard deck of cards, you draw a card. Assess the chances of drawing an ace.

d. Without putting the first card drawn back into the deck, you reshuffle the deck. Then you draw a second card. Assess the chances of drawing a red card (a heart or a diamond).