

## Chapter 6 Review Basketball

A fair coin is flipped 6 times.

- 1) Determine the probability that the coin comes up tails exactly 5 times.
- 2) Find the probability that the coin comes up tails at least 1 times.
- 3) Find the probability that the coin comes up tails at most 3 times.

4) The IRS estimates that 8% of all taxpayers filing out long forms make mistakes. Suppose that a random sample of 10,000 forms is selected. What is the approximate probability that more than 800 forms have mistakes?

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A survey conducted by the Harris polling organization discovered that 80% of all Americans are overweight. Suppose that a number of randomly selected American are weighed.

- 5) How many Americans would you expect to weigh before you encounter the first overweight individual?
- 6) Find the probability that the 4<sup>th</sup> person weighed is the first person to be overweight.
- 7) Find the probability that it takes more than 4 people to observe the first overweight person.

A coin is known to be unbalanced in such a way that heads comes up 40% of the time.

- 8) What is the probability that the first head appears on the 4<sup>th</sup> toss?
- 9) How many tosses would it take, on average, to flip two heads?
- 10) If the coin is flipped 50 times. Let  $X$  be the number of heads. What is the probability of exactly 20 heads?
- 11) If the coin is flipped 50 times. Let  $X$  be the number of heads. What is the probability of at least 20 heads?

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A factory employs several thousand workers, of whom 30% are Hispanic. If the 15 members of the union executive committee were chosen from the workers at random

12) What is the mean number of Hispanics on randomly chosen committees of 15 workers?

13) What is the standard deviation of the count  $X$  of Hispanic members?

Many local polls of public opinion use samples of size 400 to 800. Consider a poll of 400 adults in Richmond that asks the question "Do you approve of President George W. Bush's response to the World Trade Center terrorists attacks in September 2001?" Suppose we know that President Bush's approval rating on this issue nationally is 92% a week after the incident.

14) What is the random variable  $X$ ? Is  $X$  binomial?

15) Calculate the binomial probability that at most 358 of the 400 adults in the Richmond poll answer "Yes" to this question.

16) Find the expected number of people in the sample who indicate approval.

17) Find the standard deviation of  $X$ .

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Carla makes random guesses on a multiple choice test that has 5 choices for each question. We want to know how many questions Carla answers until she gets one correct.

- 18) What is the probability that Carla's first correct answer occurs on problem #5?
- 19) Construct a probability distribution table for  $X$  (from 1-5).
- 20) What is the probability that it takes more than 4 questions before Carla answers one correctly?
- 21) If Carla took a test like this test many times and randomly guessed at each question, what would be the average number of questions she would have to answer before she answered one correctly?

For boys, the average number of absences in the first grade is 15 with a standard deviation of 7; for girls the average number of absences is 10 with a standard deviation of 6.

- 22) Find the mean difference in boys and girls absences.
- 23) Find the standard deviation for the difference in boys and girls.
- 24) In a nationwide survey, suppose 100 boys and 50 girls are sampled. What is the probability that the male sample will have at most three more days of absences than the female sample?

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Key:

1) 0.09375

2) 0.984375

3) 0.65625

4) 0.4906 or 0.50

5) 1.25

6) 0.0064

7) 0.0016

8) 0.0864

9) 5

10) 0.115

11) 0.554

12) 4.5

13) 1.775

14)  $X$  = the number of people in the sample of 400 adult Richmonders who approve of the President's reaction; Yes

15) 0.0441

16) 398

17) 5.426

18) 0.082

19)

X	1	2	3	4	5
P(X)	0.2	0.16	0.128	0.1024	0.082

20) 0.4096

21) 5

22) 5

23) 1.1

24) 0.035