

## AP Statistics Section 7.1 Homework

1. In 2010, there were 1319 games played in the National Hockey League's regular season. Imagine selecting one of these games at random and then randomly selecting one of the two teams that played in the game. Define the random variable  $X$  = number of goals scored by a randomly selected team in a randomly selected game. The table below gives the probability distribution of  $X$ :

<b>Goals:</b>	0	1	2	3	4	5	6	7	8	9
<b>Probability:</b>	0.061	0.154	0.228	0.229	0.173	0.094	0.041	0.015	0.004	0.001

- Make a histogram of the probability distribution. Describe what you see.
- Say in words what the meaning of  $P(X > 6)$  is. What is the probability?
- What is the probability that the number of goals scored by a randomly selected team in a randomly selected game is at least 6?

2. Faked numbers in tax returns, invoices, or expense account claims often display patterns that aren't present in legitimate records. Some patterns, like too many round numbers, are obvious and easily avoided by a clever crook. Others are more subtle. It is a striking fact that the first digits of numbers in legitimate records often follow a model known as Benford's Law. Call the first digit of a randomly chosen record  $X$  for short. Benford's law gives this probability model for  $X$  (note that a first digit cannot be 0).

<b>First digit X:</b>	1	2	3	4	5	6	7	8	9
<b>Probability:</b>	0.301	0.176	0.125	0.097	0.079	0.067	0.058	0.051	0.046

- Make a histogram of the probability distribution. Describe what you see.
- Describe the event  $X \geq 6$  in words. What is  $P(X \geq 6)$ ?
- Express the event "first digit is at most 5" in terms of  $X$ . What is the probability of this event?

3. A study of 12,000 able-bodied male students at the University of Illinois found that their times for the mile run were approximately normal with mean 7.11 minutes and standard deviation 0.74 minutes. Choose a student at random from this group and call his time for the mile  $X$ . Find  $P(X < 6)$  and interpret the result. (Remember Chapter 2 and Table A in the book).

4. The mean height of players in the National Basketball Association is about 79 inches and the standard deviation is 3.5 inches. Assume the distribution of heights is approximately Normal. Let  $H$  = the height of a randomly-selected NBA player. Find and interpret  $P(H > 74)$

### Review from the past:

As the dangers of smoking have become more widely known, clear class differences in smoking have emerged. British government statistics classify adult men by occupation as "managerial and professional" (43% of the population), "intermediate" (34%), or "routine and manual" (23%). A survey found that 20% of men in managerial and professional occupations smoke, 29% of the intermediate group smoke, and 38% in routine and manual occupations smoke.

- Use a tree diagram to find the percent of all adult British men who smoke.
- Find the percent of male smokers who have routine and manual occupations.

