

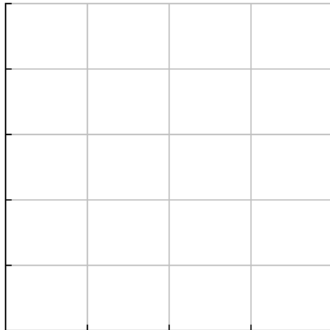
**Directions:** Read each problem and answer the questions that follow either on the worksheet paper or on a separate sheet (just make sure all questions are answered).

**Construct complete and neat histograms and tables.**

- 1.) Parus caeruleus is a small, blue, and yellow bird common to Great Britain that always lays three eggs in its nest. The number of eggs,  $x$ , which actually hatch has the following probability distribution.

<b><math>x</math> = number of hatched eggs</b>	0	1	2	3
<b>Probability</b>	0.1	0.3	0.4	0.2

- a.) Make a probability histogram.



- b.) If a nest is selected at random, how many eggs would we expect to hatch?

- c.) What percent of nests have 1 or less eggs hatch?

- d.) What percent of nests have at least 2 eggs hatch?

- 2.) A small airport is interested in the number of late aircraft arrivals per day. Thus, everyday for a year, managers count the daily number of late arrivals.

<b><math>x</math> = number of late arrivals</b>	0	1	2	3	4 +
<b>Probability</b>	0.118	0.186		0.260	0.140

- a.) What is the probability of the airport having 2 late arrivals a day?

- b.) What percent will the airport have 3 or more late arrivals?

- c.) How often will there be 1 or less late arrivals?

- d.) On any particular day, how many late arrivals would we expect?

- 3.) In 1952, Dr. Virginia Apgar suggested five criteria for measuring a baby's health at birth. Still used today, each category — skin color, heart rate, muscle tone, breathing, and response to stimulation — receives a 0, 1, or 2. Thus, a newborn's *Apgar score* will be an integer between 0 and 10. The table displays the probabilities for each possible Apgar score.

<b><math>x</math> = Apgar Score</b>	0	1	2	3	4	5	6	7	8	9	10
<b>Probability</b>	0.001	0.006	0.007	0.008	0.012	0.020	0.038	0.099	0.319	0.437	0.053

- a.) A score of 7 or more indicates a healthy baby: what percentage of newborns are considered "healthy"?

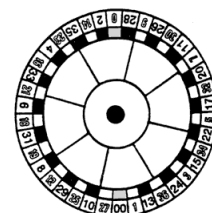
- b.) What is the expected Apgar score for a randomly selected newborn? Is a typical newborn healthy?

- 4.) The American casino game, Roulette, features a recumbent wheel with 38 "slots" along its circumference. Eighteen slots are red, eighteen are black, and two slots – numbered 0 and 00 – are green. As the wheel spins, a marble is tossed onto it, where it will ultimately land in one of the slots. When a player bets \$1 on red, and the marble lands on red, the players get the dollar back and another \$1 for "winning." Of course, if a player bets on red and the marble lands on another color, the player loses \$1. Thus, since there are only two possible values, we can easily define  $x$  as a player's net gain: either +\$1 or -\$1.

- a.) Make a table showing the possible values for  $x$  and their associated probabilities.

<b>x</b>		
<b>Probability</b>		

- b.) Find the expected value for this probability distribution.  
What does this say about a player's chances of winning in the long run?



- 5.) You are offered the following wager: a single card is drawn from a standard deck of 52 cards. If the card is an Ace, you win \$10; otherwise you lose \$1.

- a.) Make a table showing the possible values for  $x$  and their associated probabilities.

<b>x</b>		
<b>Probability</b>		

- b.) If you played this game many, many times, would be your expected financial outcome?  
(Express your answer in dollars and cents.)

- 6.) The table below shows the probability distribution for samples of five dentists and the use of nitrous oxide (laughing gas) in their practice.

<b>x = number of dentists using laughing gas</b>	0	1	2	3	4	5
<b>Probability</b>	0.0102	0.0768	0.2304	0.3456		0.0778

- a.) What is the probability of 4 dentists using laughing gas?  
b.) If you randomly selected 5 dentists, how many would we expect to use laughing gas?  
c.) What is the probability that no more than 3 of the 5 dentists use laughing gas?

- 7.) Let the output of the random variable  $x$  denote the number of defective computer parts in a shipment of 400. The following table gives the probability distribution of function of  $x$ .

<b>x = number of defective computer parts</b>	0	1	2	3	4	5
<b>Probability</b>	0.02	0.20			0.10	0.08

- a.) What is the probability of a computer with 2 and 3 defective parts if there probabilities are same?  
b.) How many shipments have at least 3 defective parts?  
c.) In a typical shipment, how many defective computer parts would you find?