

5. Management of an airline knows that 0.5% of the airline's passengers lose their luggage on domestic flights. Management also know that the average value claimed for a lost piece of luggage on domestic flights is \$600. The company is considering increasing fares by an appropriate amount to cover expected compensation to passengers who lose their luggage. By how much should the airline increase fares?

6. A grocer has shelf space for two units of a highly perishable item that must be disposed of at the end of the day if it is not sold. Each unit costs \$1.70 and sells for \$3.50. From past experience, the grocer knows that the demand for this item could be either 0, or 1, or 2 units. The grocer has to decide whether to stock one unit of this item or two units.

a) Construct the grocer's profit (payoff) in each of the following cases:

	demand = 0	demand = 1	demand = 2
stock 1 unit			
stock 2 units			

b) Suppose  $P(\text{demand} = 0) = 0.20$ ,  $P(\text{demand} = 1) = 0.30$ , and  $P(\text{demand} = 2) = 0.50$ . Find the expected payoff (profit) of both actions and choose the "optimal" action.

c) Suppose  $P(\text{demand} = 0) = 0.25$ ,  $P(\text{demand} = 1) = 0.30$ , and  $P(\text{demand} = 2) = 0.45$ . Find the expected payoff (profit) of both actions and choose the "optimal" action.

7. To save time and money when testing blood samples for the presence of a disease, the following procedure is sometimes used: Blood samples from a number of people are pooled together and the pooled sample is tested. If the pooled sample is negative, then no further testing needs to be done. If the pooled sample is positive, however, then each one of the separate samples must be tested individually. To be specific, suppose that the blood samples of 10 people are pooled together in this procedure, and suppose that the proportion of those who have the disease in the population from which the samples are drawn is 0.02. (Also assume that the presence of the disease in one sample is independent of the presence of the disease in the other samples.)

a) Find the probability that the pooled sample is negative.

b) Let  $X$  be the number of tests that must be run. Construct the probability distribution of  $X$ .

$x$	$f(x)$

c) Compute the mean of  $X$ . Is this larger or smaller than 10?

