Question 1:

I. The average cholesterol content of a certain brand of eggs is 215 milligrams, and the standard deviation is 15 mg. Assume the variable is normally distributed.
   a. If a single egg is selected, find the probability that the cholesterol content will be greater than 220 mg.
   b. If a sample of 25 eggs is selected, find the probability that the mean of the sample will be larger than 220 mg?

II. Assume that the salaries of elementary school teachers in the United States are normally distributed with a mean of $32,000 and a standard deviation of $3000.
   a. If a teacher is selected at random, find the probability that he or she makes between $28,000 and $36,000.
   b. Out of 400 teachers, how many make between 28,000 and 36,000.

III. Assume readings in a thermometer are normally distributed with a mean of 0˚C and a standard deviation of 1 ˚C. What is probability that a randomly selected thermometer reads between -2.21 ˚C and -0.72 ˚C? Draw and sketch the region.

IV. A sample of 50 adults have a mean IQ scores 100 and standard deviation of 15. Find P_{14}, which is the IQ score separating the bottom 14% from the top 86% of the sample.
   a. What happens to the mean and standard deviation of the distribution of sample means as the size of the sample decreases?
      I. The mean of the sample means stays constant and the standard error increases.
      II. The mean of the sample means stays constant and the standard error decreases.
      III. The mean of the sample means decreases and the standard error increases.
      IV. The mean of the sample means increases and the standard error stays constant.
   b. If the sample size is multiplied by 4, what happens to the standard deviation of the distribution of sample means?
      I. The standard error is halved.
      II. The standard error is decreased by a factor of 4.
      III. The standard error is doubled.
      IV. The standard error is increased by a factor of 4.
Question 3:
There are 185 statistics students in a Midwestern college, and their mean age is 26.3 with a standard deviation of 8.0. If each student is required to find the ages of a sample of 16 students, what is the standard deviation of the sampling distribution of the sample means?

Question 4:
What is the expected value of the probability distribution given below?

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<thead>
<tr>
<th>x</th>
<th>P(x)</th>
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<tbody>
<tr>
<td>0</td>
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</tr>
<tr>
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<tr>
<td>30</td>
<td>0.3</td>
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<tr>
<td>40</td>
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Question 5
A deck of cards has 52 cards with 13 hearts. A gambling game consists of a player drawing three cards without replacement. The required bet is $1000 i.e. you need $10 to buy into the game. The winnings depend on the number of hearts drawn out of the three cards. If you get no hearts you win $0, for 1 heart you receive $10, for 2 hearts you can win 20 and for all hearts you can win 500.

1. What is the probability distribution for number of hearts drawn?

2. What would be the average gain?

3. What is the variance and standard deviation for the gain?

Question 6
I. The distribution of cholesterol levels in teenage boys is approximately normal with \( \mu = 170 \) and \( \sigma = 30 \). Levels above 200 warrant attention. What percent of teenage boys have levels between 170 and 225?

II. An airline knows from experience that the distribution of the number of suitcases that get lost each week on a certain route is approximately normal with \( \mu = 15.5 \) and \( \sigma = 3.6 \). In one year, how many weeks would you expect the airline to lose between 10 and 20 suitcases?

III. Assume that blood pressure readings are normally distributed with \( \mu = 120 \) and \( \sigma = 8 \). A blood pressure reading of 145 or more may require medical attention. What percent of people have a blood pressure reading greater than 145?