

AP Statistics – Chapter 7 and Previous Problems

An automobile insurer has found that repair claims have a mean of \$920 and a standard deviation of \$870. Suppose that the next 100 claims can be regarded as a random sample from the long-run claims process. The probability that the average of these 100 claims is larger than \$1000 is approximately ____.

.1788

A factory produces plate-glass sheets with a mean thickness of 4 millimeters and a standard deviation of thickness of 1.1 millimeters. A simple random sample of 100 sheets of glass is to be selected and measured, and the sample mean thickness \bar{X} of the 100 sheets is to be computed. The probability that the average thickness \bar{X} of the 100 sheets of glass is less than 4.1 millimeters is approximately _____.

.8186

The distribution of actual weights of 8-ounce chocolate bars produced by a certain machine is normal with mean 8.1 ounces and standard deviation 0.1 ounces. If a sample of five of these chocolate bars is selected, there is only a 5% chance that their average weight will be below _____.

8.03 ounces

The weights of extra-large eggs have a normal distribution with a mean of 1 ounce and a standard deviation of 0.1 ounces. The probability that a dozen extra-large eggs has a total weight of more than 13 ounces is closest to _____.

.0020

A researcher initially plans to take a SRS of size n from a population that has mean 80 and standard deviation 20. If he were to double his sample size (to $2n$), the standard deviation of the sampling distribution of \bar{X} , the sample mean of the observations, would change by a factor of _____.

$\frac{1}{\sqrt{2}}$

Suppose that you are a student worker in the statistics department, and they agree to pay you using the Random Pay system. Each week the chair of the department flips a coin. If it comes up heads, your pay for the week is \$80; if it comes up tails, your pay for the week is \$40. Your friend is working for the engineering department and makes \$65 per week. The probability that your total earnings in 100 weeks are more than hers is approximately _____.

.4013

I select a simple random sample of 4000 batteries produced in a manufacturing plant. I test each battery and record how long it takes for each battery to fail. I then compute the average \bar{X} of all 4000 failure times. The sampling distribution of \bar{X} might be modeled as having approximately a _____ distribution.

Normal

The scores of individual students on the American College Testing (ACT) Program composite college entrance examination have a normal distribution with mean 18.6 and standard deviation 6.0. At Northside High, 36 seniors take the test. If the scores at this school have the same distribution as national scores, what are the mean and standard deviation of the sampling distribution of the average (sample mean) score for the 36 students?

18.6, 1.0

A random variable X has mean μ_X and standard deviation σ_X . Suppose n independent observations of X are taken and the average \bar{x} of these n observations is computed. We can assert that if n is very large, the sampling distribution of \bar{x} is approximately normal. This assertion follows from

_____.

The Central Limit Theorem

A college basketball player makes 80% of his free throws. Over the course of the season he will attempt 100 free throws. Assuming free throw attempts are independent, what is the probability that he makes at least 90 of these attempts?

.0062

A multiple-choice exam has 100 questions, each with five possible answers. If a student is just guessing at all the answers, the probability that he or she will get more than 30 correct is _____.

.0062

In a test of ESP (extrasensory perception), the experimenter looks at cards that are hidden from the subject. Each card contains a star, a circle, a wavy line, or a square. An experimenter looks at each of 100 cards in turn, and the subject tries to read the experimenter's mind and name the shape on each card. What is the probability that the subject gets more than 30 correct if the subject does not have ESP and is just guessing?

0.123

Suppose we select an SRS of size $n = 100$ from a large population having proportion p of successes. Let X be the number of successes in the sample. For which values of p would it be safe to assume the sampling distribution of X is approximately normal?

$.1 \leq p \leq .9$

A fair coin (one for which both the probability of heads and the probability of tails are 0.5) is tossed 60 times. The probability that less than $1/3$ of the tosses are heads is _____.

.0043

A survey asks a random sample of 1500 adults in Ohio if they support an increase in the state sales tax from 5% to 6%, with the additional revenue going to education. Let \hat{p} denote the proportion in the sample that say they support the increase. Suppose that 40% of *all* adults in Ohio support the increase. The probability that \hat{p} is more than 0.50 is _____.

<.0001

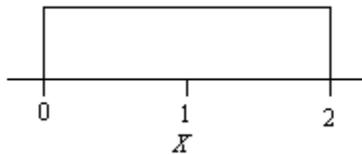
Suppose you are going to roll a die 60 times and record \hat{p} , the proportion of times that an even number (2, 4, or 6) is showing. The sampling distribution of \hat{p} should be centered at about _____.

$\frac{1}{2}$

The number of undergraduates at Johns Hopkins University is approximately 2000, while the number at Ohio State University is approximately 40,000. A simple random sample of about 3% of the undergraduates is taken from both schools. How does the variability of statistics taken from these two samples compare?

Statistics taken from the Johns Hopkins sample have more variability than those from Ohio State.

The probability density curve of a random variable X is given in the figure below.



The probability that X is at least 1.5 is _____.

The probability that $X = 1.5$ is _____.

.25, 0

In a particular game, a fair die is tossed. If the number of spots showing is either 4 or 5, you win \$1; if number of spots showing is 6, you win \$4; and if the number of spots showing is 1, 2, or 3, you win nothing. Let X be the amount that you win on a single play of the game. The expected value of X is _____.

\$1

A psychologist studied the number of puzzles subjects were able to solve in a five-minute period while listening to soothing music. Let X be the number of puzzles completed successfully by a subject. The psychologist found that X had the following probability distribution.

Value of X	1	2	3	4
Probability	0.2	0.4	0.3	0.1

If three subjects solve puzzles for five minutes each and the numbers of puzzles solved by the subjects are independent of each other, then the mean of the total number of puzzles solved by the three subjects is _____.

6.9

A market research company employs a large number of typists to enter data into a computer. The time taken for new typists to learn the computer system is known to have a normal distribution with a mean of 90 minutes and a standard deviation of 18 minutes. The proportion of new typists that take more than two hours to learn the computer system is _____.

0.048

Birthweights at a local hospital have a normal distribution with a mean of 110 ounces and a standard deviation of 15 ounces. The proportion of infants with birthweights between 125 ounces and 140 ounces is _____.

0.136

The scores on a university examination are normally distributed with a mean of 62 and a standard deviation of 11. If the bottom 5% of students will fail the course, what is the lowest mark (rounded to the nearest whole number) that a student can have and still be awarded a passing grade?

44

The time it takes for students to complete a standardized exam is approximately normal with a mean of 70 minutes and a standard deviation of 10 minutes. How much time should be given to complete the exam so that 80% of the students will complete the exam in the time given?

78.4 minutes

The weights of boxes of cookies produced by a certain manufacturer have a normal distribution with a mean of 202 grams and a standard deviation of 3 grams. Rounded to the nearest whole number, the weight that should be stamped on each box so that only 1% of all boxes are underweight is _____.

195 grams