

1. Consider the following probability distribution for the discrete random variable X .

X	$P(X)$
4	.20
5	.15
6	.36
7	.14
8	.15

2. Find the mean of the discrete random variable X .
3. Find the standard deviation of the discrete random variable X .
4. Suppose that it is known that 20 percent of all college students abstain from drinking. A random sample of 6 students is selected.
 - (a) Find the probability that exactly 3 students in this sample abstain from drinking.
 - (b) Find the probability that at least 4 students in this sample abstain from drinking.
 - (c) Find the probability that none of the students selected abstain from drinking.
5. The quality control department at Target randomly selects from a shipment a box that contains 20 DVD players and tests for defective DVD players. The inspector will randomly select 5 DVD players from the box and reject the shipment if more than 1 of the tested DVD players is defective. Unknown to the inspector, the box he chose contains 4 defective DVD players.
 - (a) What is the probability that this shipment will be accepted?
 - (b) What is the probability that this shipment will be rejected?
6. Find the following probabilities for the standard normal distribution.
 - (a) $P(-1 < z < 1.15)$
 - (b) $P(1.12 < z < 2.22)$
 - (c) $P(z < 1.75)$
7. Let x be a normally distributed continuous random variable such that $\mu = 14$ and $\sigma = 5$. Find the following probabilities.
 - (a) $P(11 < x < 15)$
 - (b) $P(16 < x < 20)$
 - (c) $P(x > 13)$

8. Suppose that it is known that 20 percent of all college students abstain from drinking. A random sample of 200 students is selected.
 - (a) Find the probability that exactly 40 students in this sample abstain from drinking.
 - (b) Find the probability that between 35 and 50 students in this sample abstain from drinking.

9. The mean wage for 1000 employees at a company is \$15.50 and the standard deviation is \$2.50. Let \bar{x} be the mean wage of a random sample of 50 employees.
 - (a) Find the mean $\mu_{\bar{x}}$ of the sampling distribution.
 - (b) Find the standard deviation $\sigma_{\bar{x}}$ of the sampling distribution.
 - (c) Find the probability that \bar{x} will be between \$14.00 and \$16.00.

10. It is known that 35 percent of the population has a certain characteristic. A random sample of 50 members of the population is chosen. Let \hat{p} be the proportion of the sample which has the characteristic.
 - (a) Find the mean $\mu_{\hat{p}}$ of the sample proportion.
 - (b) Find the standard deviation $\sigma_{\hat{p}}$ of the sample proportion.
 - (c) Find the probability that \hat{p} will be between .30 and .40.

11. A random sample of 100 members of the population is taken and it is found that of the 100 members, the mean age is 34.5 and the standard deviation is 8.3.
 - (a) What is the point estimate for the population mean?
 - (b) Find a 90 percent confidence interval for the population mean.
 - (c) Find a 99 percent confidence interval for the population mean.
 - (d) Suppose you want the 99 percent confidence interval to be $\bar{x} \pm 1.5$. How large should you make your sample size in order to ensure this?

12. In a random sample of 15 giraffes it is found that the mean length of neck is 6.25 feet.
 - (a) What is a point estimate for the mean length of the neck of a giraffe?
 - (b) Find a 90 percent confidence interval for the mean length of a giraffe's neck.
 - (c) Find a 99 percent confidence interval for the mean length of a giraffe's neck.

13. A random sample of 100 members of the population finds that 45 of sample contain a certain characteristic.

- (a) Find a point estimate for the population proportion.
- (b) Find a 90 percent confidence interval for the population proportion.
- (c) Find a 99 percent confidence interval for the population proportion.
- (d) Suppose you want the 99 percent confidence interval to be $\hat{p} \pm .05$. How large should you make your sample size in order to ensure this?