

Assignment #3, Due 2025/11/27

1. In a large university, 20% of the students are business majors. A random sample of 100 students is selected, and their majors are recorded.
 - (a) Compute the standard error of the proportion.
 - (b) What is the probability that the sample contains at least 12 business majors?
 - (c) What is the probability that the sample contains less than 15 business majors?
 - (d) What is the probability that the sample contains between 12 and 14 business majors?
2. A bank has kept records of the checking balances of its customers and determined that the average daily balance of its customers is \$300 with a standard deviation of \$48. A random sample of 144 checking accounts is selected.
 - (a) What is the probability that the sample mean will be more than \$306.60?
 - (b) What is the probability that the sample mean will be less than \$308?
 - (c) What is the probability that the sample mean will be between \$302 and \$308?
 - (d) What is the probability that the sample mean will be at least \$296?
3. A random sample of ten examination papers in a course that was given on a pass or fail basis showed the following scores.

Paper Number	Grade	Status
1	65	Pass
2	87	Pass
3	92	Pass
4	35	Fail
5	79	Pass
6	100	Pass
7	48	Fail
8	74	Pass
9	79	Pass
10	91	Pass

- (a) What is the point estimate for the average grade?
 - (b) What is the point estimate for the proportion of all students who passed the course?
 - (c) Construct a 99% confidence interval for the average grade.
 - (d) Construct a 98% confidence interval for the average grade.
 - (e) Discuss why the 98% and 99% confidence intervals are different.
4. A simple random sample of 1,067 people resulted in a sample proportion of 0.4 in favor of candidate A. Construct a 95% confidence interval for the population proportion.
5. MNM Corporation gives each of its employees an aptitude test. The scores on the

test are normally distributed with a mean of 75 and a standard deviation of 15. A simple random sample of 25 is taken from a population of 500.

- (a) What are the expected value, the standard deviation, and the shape of the sampling distribution of \bar{x} ?
 - (b) What is the probability that the average aptitude test in the sample will be between 70.14 and 82.14?
 - (c) Find a value, C, such that $P(\bar{x} \geq C) = .015$
6. The sampling methods often have a big impact on the behavior of the sample average. Based on the following data (the height of a singer, in inches), use simple random sampling, stratified random sampling, cluster sampling, and systematic sampling to draw 20 observations. Continue the process 10 times and discuss the results you have.

Soprano	Alto	Tenor	Bass
64	65	69	72
62	62	72	70
66	68	71	72
65	67	66	69
60	67	76	73
61	63	74	71
65	67	71	72
66	66	66	68
65	63	68	68
63	72	67	71
67	62	70	66
65	61	65	68
62	66	72	71
65	64	70	73
68	60	68	73
65	61	73	70
63	66	66	68
65	66	68	70
62	66	67	75
65	62	64	68
66	70		71
62	65		70
65	64		74
63	63		70
65	65		75
66	69		75
65	61		69
62	66		72
65	65		71
66	61		70
65	63		71
61	64		68
65	67		70
66	66		75
65	68		72
62			66
			72
			70
			69