

MATH 3307

Homework 5 (Lessons 15 - 16)

Instructions: Answer all questions through the EMCF tab of casa under the assignment named "Homework 5" before the deadline.

There is no "Submit" button. Your answers will be automatically submitted once the deadline arrives.

Assignments will be graded out of 20 points.

1. True or False: On a standard normal curve, the 68th percentile corresponds to the mean of the data set.
A. True B. False
2. If a sample has a mean of 100 and standard deviation of 6, what value would correspond the the z-score of 2?
A. 88 B. 102 C. 106 D. 112 E. 598
3. Determine $P(Z < -1.82)$
A. 0.2877 B. 0.3969 C. 0.8883 D. 0.0344 E. 0.8599
4. Determine $P(-1.68 < Z < 2.09)$
A. 0.9352 B. 0.3969 C. 0.8883 D. 0.0344 E. 0.8599
5. Determine $P(Z > 0.56)$
A. 0.9352 B. 0.3969 C. 0.2877 D. 0.0344 E. 0.8599
6. Determine $P(-0.52 < Z < 0.52)$
A. 0.9352 B. 0.3969 C. 0.8883 D. 0.2877 E. 0.8599
7. Determine $P(-2.09 < Z < 1.32)$
A. 0.2877 B. 0.9352 C. 0.8883 D. 0.0344 E. 0.8599
8. Determine $P(Z > -1.08)$
A. 0.9352 B. 0.3969 C. 0.8883 D. 0.0344 E. 0.8599

For Questions 9 - 14, consider the distribution $N(210, 32)$.

9. Determine $P(X < 230)$.

- A. 0.2660 B. 0.7340 C. 0.0000029 D. 0.1370 E. 0.6887

10. Determine $P(180 < X < 245)$.

- A. 0.2660 B. 0.7340 C. 0.0000029 D. 0.1370 E. 0.6887

11. Determine $P(X > 190)$.

- A. 0.2660 B. 0.7340 C. 0.0000029 D. 0.1370 E. 0.6887

12. Find the value of c such that $P(X < c) = 0.0344$

- A. 231.26 B. 231.58 C. 151.77 D. 268.23 E. 188.56

13. Find the value of c such that $P(X > c) = 0.7486$

- A. 231.26 B. 231.58 C. 151.77 D. 268.23 E. 188.56

14. Determine the value of the Upper Quartile.

- A. 231.26 B. 231.58 C. 151.77 D. 268.23 E. 188.56

15. In a certain town (A), a family's mean weekly grocery spending is \$450 with a standard deviation of \$35. In a second town (B), the mean is \$575 with a standard deviation of \$10. A person in Town A has a weekly grocery budget of \$400, and a person in Town B has a weekly budget of \$450. Which person spends more on groceries, relative to the others in their communities?

- A. The person from Town A spent more, relative to the others in the town.
B. The person from Town B spent more, relative to the others in the town.
C. The two people spent the same amount, relative to others in their town.
D. It cannot be determined from the information provided who spent more.

- A. 0.1582 B. 0.0164 C. 0.5260
D. 0.3517 E. 0.6563

16. A supervisor has determined that the average salary of employees in his department is \$40,000 with a standard deviation of \$15,000. A sample of 25 employee salaries was selected at random. Assuming the distribution of salaries is normal what the probability that the average salary for this sample is between \$36,000 and \$42,000?

A. 0.1582

B. 0.0164

C. 0.5260

D. 0.3517

E. 0.6563

17. At a large bank, account balances are normally distributed with a mean of \$1,637.52 and a standard deviation of \$623.16. What is the probability that a random sample of 400 accounts has an average balance that exceeds \$1650?

A. 0.3444

B. 0.6556

C. 0.5080

D. 0.4920

E. 0.9998

18. In a large population, 76% of households have microwaves. A simple random sample of 100 households is to be contracted and the sample proportion computed. What is the mean and standard deviation of the sampling distributions of the sample proportions?

A. $\mu_{\hat{p}} = 76$ $\sigma_{\hat{p}} = 0.0872$

B. $\mu_{\hat{p}} = 0.76$ $\sigma_{\hat{p}} = 0.0018$

C. $\mu_{\hat{p}} = 0.76$ $\sigma_{\hat{p}} = 0.0427$

D. $\mu_{\hat{p}} = 0.24$ $\sigma_{\hat{p}} = 0.0427$

E. $\mu_{\hat{p}} = 0.76$ $\sigma_{\hat{p}} = 0.0043$

19. Suppose that 20% of adult women in the United States dye or highlight their hair. What is the probability that a simple random sample of size 200 would come within plus or minus three percentage points of this value?

- A. 0.8664 B. 0.7112 C. 0.0598 D. 0.2923
E. Assumptions were not met, so problem cannot be solved.

20. Determine the following:

Part A: $P(X > 654)$ for $N(650, 10)$

Part B: $P(Z < 0.72)$

Proposed Solution:

Part A: $1 - \text{pnorm}(654, 650, 10) = 0.3445783$

Part B: $\text{qnorm}(0.72) = 0.5828415$

What was done wrong in the proposed solution?

- A. In Part B, the command $\text{pnorm}(0.72)$ should have been used since we are looking for a probability.
- B. In Part B, no mean or standard deviation was provided, so the problem cannot be solved.
- C. In Part A, $\text{pnorm}(654, 650, 10)$ should have been used, without the subtraction.
- D. In Part A, the mean and standard deviation were not explicitly stated, so the problem cannot be solved.
- E. Nothing was done wrong in the proposed solution.