MATH-1110 (DUPRÉ) FALL 2018 TEST 3 ANSWERS

1. PRINT YOUR LAST NAME IN THE UPPER RIGHT CORNER IN LARGE CAPITAL LETTERS.

2. PRINT YOUR FIRST NAME UNDERNEATH YOUR LAST NAME IN THE UPPER RIGHT CORNER IN CAPITAL LETTERS.

3. PRINT YOUR LAB DAY AND LAB START TIME UNDERNEATH YOUR FIRST NAME IN THE UPPER RIGHT CORNER.

4. WRITE YOUR MATH-1110 COURSE AND SECTION NUMBER UNDERNEATH YOUR LAB DAY IN THE UPPER RIGHT CORNER.

The remaining problems all use the following information. We use Z to denote a standard normal random variable and t_d to denote a random variable having $t-$distribution with d degrees of freedom. If $0 < a < 1$, then z_a denotes the real number with the property that $P(Z > z_a) = a$, and $t_{d,a}$ denotes the real number with $P(t_d > t_{d,a}) = a$. We assume that X is the weight in pounds of a fish randomly chosen from the population of fish in Sam's pond, normally distributed with mean weight μ_X and standard deviation σ_X, which Sam knows but Joe does not. Sam and Joe took an IRS of 4 fish and found $\bar{x} = 8$ and $s = 2$. We use $C(n, r)$ for the number of ways to choose r things from a set of n things and $P(n, r)$ for the number of ways to arrange r things taken from a set of n things. We use $r! = (1)(2)(3)\cdots(r)$. IRS=INDEPENDENT RANDOM SAMPLE. MARGIN OF ERROR=M.

5. What is $P(|Z| > z_{0.8})$?

ANSWER: The correct answers is obviously 1 because $|Z| \geq 0$ and $z_{0.8} < 0$. However, as stated, the problem had a typo. I meant for the $z_{.8}$ to be $z_{0.08}$, so $P(|Z| > z_{0.08}) = P(Z > z_{0.08}) + P(Z < -z_{0.08}) = .08 + .08 = 0.16$

6. What is the exact numerical value of $P(7, 4)/C(7, 4)$?

ANSWER: In general, $P(n, r) = (r!)C(n, r)$, so $P(n, r)/C(n, r) = r!$ and therefore $P(7, 4)/C(7, 4) = 4! = 24$.

7. What is the probability that a four card hand chosen from a standard deck of 52 cards has exactly three of a kind?

ANSWER: $C(13, 2)C(2, 1)C(4, 3)C(4, 1)/C(52, 4)$

8. What is the probability that a fair dice rolled 12 times comes up 3 exactly 4 times?

ANSWER: $C(12, 4)(1/6)^4(5/6)^8$

9. If 12 cards are chosen from a standard deck of 52 cards, what is the probability that exactly 4 are clubs?

ANSWER: $C(13, 4)C(39, 8)/C(52, 12)$

10. If Sam knows $\sigma_X = 2$, for estimating μ_X, what is Sam's STANDARD error of the mean?

ANSWER: Standard error of the mean $= \sigma_X/\sqrt{n} = 2/\sqrt{4} = 2/2 = 1$.

11. From the sample, if Sam knows $\sigma_X = 2$, what is Sam's MARGIN of error, M, for estimating μ_X with confidence $C = .9$?

ANSWER: $M = (z_{.05})\sigma_X/\sqrt{n} = (z_{.05})(2)/\sqrt{4} = z_{.05}$

12. From the given sample data, what is Joe's MARGIN of error M, in his estimate of μ_X, if Joe wants confidence $C = .9$?

ANSWER: $M = (t_{3,.05})s/\sqrt{n} = (t_{3,.05})(2)/\sqrt{4} = t_{3,.05}$