FIRST: PRINT YOUR LAST NAME IN LARGE CAPITAL LETTERS ON THE UPPER RIGHT CORNER OF EACH SHEET.
SECOND: PRINT YOUR FIRST NAME IN CAPITAL LETTERS DIRECTLY UNDERNEATH YOUR LAST NAME.
THIRD: WRITE YOUR FALL 2010 MATH-1230 LAB DAY DIRECTLY UNDERNEATH YOU FIRST NAME.
FOURTH: WRITE YOUR FALL 2010 MATH-1230 LECTURER’S NAME UNDERNEATH YOUR LAB DAY

FIFTH: All your work must be your own. You are only allowed to use a writing instrument and your calculator. Show all your work in the space provided indicating your calculation done in the calculator. Any textual part of your answer should be printed clearly in CAPITAL LETTERS.

SIXTH: FAILURE TO FOLLOW ALL THE ABOVE DIRECTIONS MAY RESULT IN YOUR RECEIVING A FAILING GRADE

STANDARD INFORMATION: A Standard Dice has six faces and each face has a number of spots, that number being a positive whole number no more than six. The total number of spots on any pair of opposite faces is seven. Since there are exactly three pair of opposite faces, the total number of spots on a dice is twenty one. A Standard Deck of Cards has 52 cards, four suits of 13 cards (denominations) each. The four suits are spades(♠), hearts(♥), diamonds(♦), and clubs(♣). Each suit has 3 face cards: Jack, Queen, King, and an Ace. In each suit, the cards which are not face cards each have a number of spots in the shape of the particular suit, the number of spots being a whole number no more than ten, the card with a single spot being the Ace of that suit. For example, the card with four spots each in the shape of a diamond is called ”the four of diamonds(4♦)”, whereas the card with the face labelled with ”J” and a spade shaped spot is ”Jack of spades(J♠)”. A Standard (American) Roulette Wheel has a spinner with 38 slots which spins in a large bowl. A ball is sent rolling in opposite direction to the spin of the wheel near the upper rim of the bowl and as both the spinning wheel and ball slow down, the ball falls into one of the 38 slots. Two of the slots are colored green, one labelled zero (0) and the other labelled with two zeros (00), and referred to as ”double zero”. The remaining slots are each colored either red or black and numbered with the positive whole numbers no more than 36.
1. If the expected length of a redfish randomly selected from the Gulf of Mexico is 14 inches and the expected length of a bluefish randomly selected from the Gulf of Mexico is expected to be 20 inches, and if we randomly select two redfish and three bluefish from the Gulf of Mexico and add their lengths, what should we expect for the total length of all five fish?

2. If a standard red dice with white spots has one of its faces painted completely blue, without seeing this dice, what is the probability that the number of spots painted blue is even?

3. If a standard red dice with white spots has one of its faces painted completely blue, without seeing this dice, what is the expected number of spots painted blue?

4. If a standard red dice with white spots has one of its faces painted completely blue, without seeing this dice, what is the expected number of spots painted blue given that that number is even?

5. If $X$ is a positive whole number that I have chosen and $X$ is four times as likely to be even as odd, then what is the probability that $X$ is odd?

6. If 8 cards are dealt from the top of a well shuffled standard deck of cards one after another without replacement, what is the chance that the third card is a heart?
7. If 8 cards are dealt from the top of a well shuffled standard deck of cards one after another without replacement, what is the chance that the fourth is a spade, given that the last three are spades?

8. Suppose that \( A, B \) and \( C \) are statements and that \( P(A|B&C) = .4 \), that \( P(A|C) = .7 \), and that \( P(B|C) = .6 \). Calculate \( P(B|A&C) \).

9. If the digits 1,2,3,4,5,6,7,8 are used to form a 6 digit number without using any digits more than once, give the exact probability the result is 234567. Express your answer as a reduced fraction.

10. A wildlife biologist studying the relationship between length and weight of redfish finds an independent random sample of 10000 redfish with mean length 15 inches with sample standard deviation 4 inches, their sample mean weight is 4 pounds with a standard deviation of 2 pounds, and the sample correlation coefficient of length with weight is .3. Based on this sample data, what should the biologist expect for the weight of a redfish which is 12 inches long by using linear regression?

11. A wildlife biologist studying the relationship between length and weight of redfish finds an independent random sample of 10000 redfish with mean length 15 inches with sample standard deviation 4 inches, their sample mean weight is 4 pounds with a standard deviation of 2 pounds, and the sample correlation coefficient of length with weight is .3. Based on this sample data, what should the biologist expect for the squared error when using linear regression to predict the weight of a 12 inch redfish?
12. Suppose that \( X \) is an unknown or random variable which is a number in the set \( S = \{0, 1, 3, 4\} \). Suppose that \( P(X = 0) = .1 \), \( P(X = 1) = .2 \), and \( P(X = 3) = .4 \). What is the mean of \( X \)?

13. Suppose that \( X \) is an unknown or random variable which is a number in the set \( S = \{0, 1, 3, 4\} \). Suppose that \( P(X = 0) = .1 \), \( P(X = 1) = .2 \), and \( P(X = 3) = .4 \). What is the variance of \( X \)?

14. Suppose that \( X \) and \( Y \) are random variables with mean 20 and standard deviation 4, and that \( X \) and \( Y \) are independent of each other. If \( U \) is defined as

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U = \left( X - \frac{X + Y}{2} \right)^2 + \left( Y - \frac{X + Y}{2} \right)^2,
\]

what is the expected value of \( U \)?

15. Suppose that I do not know the true proportion of voters who will support Goofy for Mayor of Duckburg in an upcoming election, but I would like to make a 99 percent Confidence Interval for that true proportion using an independent random sample of this voting population. I want the Margin of Error to be no more than .005. How big must my sample be?

16. Suppose that I do not know the mean length of the fish in my pond but I would like to make a 99 percent confidence interval for the true mean length of the fish in my pond using an independent random sample. I want the Margin of Error to be no more than half of an inch, and I know that the length of fish in my pond is normally distributed with standard deviation 4 inches. How big must my sample be?
17. Suppose that I do not know the mean weight of the fish in my pond. Suppose that I have an independent random sample of 9 fish with sample mean $\bar{x} = 4.5$ pounds. Suppose that I know that the weight of fish in my pond is normally distributed with standard deviation 1.5 pounds. What is the significance of this data as evidence that the true mean weight of the fish in my pond actually exceeds 3 pounds?

18. Suppose that in my pond are found both red fish and blue fish and I do not know the true mean weight for either of these two populations. Suppose that I would like to make a 95 percent confidence interval for the amount the redfish on average exceed blue fish in weight. Suppose that I do not know the population standard deviation in weight of red fish nor the population standard deviation of blue fish. Suppose also that I assume both populations are normal with the same standard deviation. If I have an independent random sample of 7 red fish having a mean weight of 4.5 pounds with standard deviation 1.5 pounds and an independent random sample of 5 blue fish having mean weight of 3.2 pounds with a standard deviation of 1.2 pounds, then what is the confidence interval for the difference in true means, $\mu_R - \mu_B$, where $\mu_R$ denotes the true mean weight of red fish and $\mu_B$ denotes the true mean weight of blue fish.

19. Suppose that in my pond are found both red fish and blue fish and I do not know the true mean weight for either of these two populations. Suppose that I do not know the population standard deviation in weight of red fish nor the population standard deviation of blue fish. Suppose also that I assume both populations are normal, but that their standard deviations may not be the same. If I have an independent random sample of 7 red fish having a mean weight of 4.5 pounds with standard deviation 1.5 pounds and an independent random sample of 5 blue fish having mean weight of 3.2 pounds with a standard deviation of 1.2 pounds, then what is the significance of this data as evidence that the true mean weight of redfish in my pond exceeds that of bluefish in my pond?

20. In Duckburg, Mickey is running against Donald for Mayor. A simple random sample of 8 registered Duckburg voters results in 7 for Mickey and only 1 for Donald. What is the significance of this data as evidence that the true proportion of registered Duckburg voters that support Mickey for Mayor exceeds 70 percent?