

Do the problems in order in your bluebook. Show your work.

1. Use a Venn diagram to determine whether the following is a valid syllogism:
College classes are fun.
Math 110 is a college class.
Therefore, Math 110 is fun.
2. State the contrapositive of “If this is your favorite class then you will do well.”
3. Use a truth table to determine whether or not the wffs $p \rightarrow q$ and $(\neg p) \vee q$ are equivalent.
4. Draw a Venn diagram for two sets A and B (in a universal set U) for which A is a non-empty proper subset of B . In it shade the region $B \cap A^c$.
5. No area code (a 3-digit number) can start with either a 0 or a 1. How many possible area codes there are? (Don't worry about any other restrictions that the phone company might use.) Explain your answer.
6. How many (5 card) poker hands have at exactly three kings? Explain your answer.
7. From a group of nine men and five women, you wish to form a committee of three men and two women. How many different committees can you form? Explain your answer.
8. Find the probability of getting at least two heads when flipping a coin three times. Explain your answer.

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1. What is the probability of drawing “a picture card or a heart” from a deck of cards ?
2. A person playing the new casino game “Math-Casino” has odds of 123 to 2 against winning. What is the probability of winning playing this game ?
3. You roll 2 dice. What is the probability that the total on the two dice is at least ten given that it is even ?
4. You flip a coin three times. Find the probability of getting three heads given that you get at least two heads.
5. The local Math store hires you as a salesman. You are told that you will receive a commissions. The commission will be \$100 with probability 0.73, or \$1000 with probability 0.17, or \$5000 with probability 0.10. What is your expected commission ?
6. You pay a dollar and roll two dice. If the sum is at least nine you’re paid four dollars (for a net gain of three). Otherwise you’re paid nothing. What is the expected value of playing this game ?
7. Spacely Sprockets buys 48% of its materials from Mobile, 27% from Pensacola, and the rest from Biloxi. Of these materials, 6% of those from Mobile are substandard, 11% of those from Pensacola are substandard, and 9% of those from Biloxi are substandard. Are the events “materials purchased are substandard” and “materials purchased are not from Alabama” independent ?
8. You flip a coin three times. Determine whether or not the events “the first two tosses are heads” and “the third toss is a head” are independent.

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1. Compute the mean, median, and mode of the data set $\{0, 0, 0, 1, 1, 1, 2, 2, 2, 3, 5, 7, 15, 17, 27, 27, 55, 55, 55, 55\}$
2. A data set has a frequency histogram with three bars, one at $x = 2$ with height 5, another at $x = 5$ with height 8, and one at $x = 20$ with height 2. Find the mean and standard deviation of the data set.
3. Market research shows that each year 70% of people who drink 6-up keep drinking 6-up, while the rest switch to Sprout. And 80% of those who drink Sprout keep drinking Sprout, with the remainder switching to 6-up. Find the transition matrix. Suppose initially everyone drinks Sprout. What will the market breakdown be two years later? (Be sure to label which percentage is which.)
4. The local Math store starts selling chalk-stained blue jeans. These pants shrink in length, with the amount of shrinkage being normally distributed with mean 2 inches and standard deviation $\frac{1}{2}$ inch. What percentage of pants will have shrinkage greater than 3 inches?
5. A poll of 400 Math 110 students is reported to have a margin of error of 3.275%. Find the level of confidence of the poll.
6. The amount of time between taking the decongestant Sideffect and getting relief is normally distributed with a mean of 32 minutes and a standard deviation of 8 minutes. Find the probability that the time between taking Sideffect and getting relief is between 24 and 36 minutes.
7. A survey of 625 Math 110 students shows that 73% feel that studying math is more fun than going to the beach. Find the MOE assuming a confidence level of 92%.

Do the problems in order in your bluebook. Show and justify your work.

1. Use a Venn diagram to determine whether the following is a valid syllogism:
Math classes are fun.
This class is a math class.
Therefore, this class is fun.
2. Use a truth table to determine whether or not the wffs $(\neg p) \rightarrow q$ and $p \vee q$ are equivalent.
3. From a group of eleven men and six women, you wish to form a committee of four men and three women. How many different committees can you form ? Explain your answer.
4. What is the probability of getting a full house (a three-of-a-kind and a pair) when you draw five cards from a deck of cards ?
5. You flip a coin three times. Find the probability of getting at least two heads.
6. You pay a dollar and roll two dice. If the sum is at least ten you're paid three dollars (for a net gain of two). Otherwise you're paid nothing. What is the expected value of playing this game ?
7. You flip a coin three times. Determine whether or not the events "the first two tosses are tails" and "the third toss is a head" are independent.
8. A data set has a frequency histogram with four bars, one at $x = 2$ with height 5, another at $x = 7$ with height 3, another at $x = 9$ with height 1, and one at $x = 10$ with height 1. Find the mean and standard deviation of the data set.
9. Market research shows that each year 60% of people who drink 6-up keep drinking 6-up, while the rest switch to Sprout. And 70% of those who drink Sprout keep drinking Sprout, with the remainder switching to 6-up. Find the transition matrix. Suppose initially everyone drinks Sprout. What will the market breakdown be two years later ? (Be sure to label which percentage is which.)
10. The amount of time between taking the decongestant Sideffect and getting relief is normally distributed with a mean of 25 minutes and a standard deviation of 5 minutes. Find the probability that the time between taking Sideffect and getting relief is between 20 and 35 minutes.