

Finite Mathematics; Quiz 0

1. Print your name. What is your year in school and your (probable) major ?
2. Why are you taking this course and this particular section of it ?
3. What is Mathematics and why do we study it ?
4. What do you like most about math ? What do you like least about it ?
5. Do you have math anxiety, and, if so, what do you plan on doing about it ?
6. What grade do you honestly expect to get from this class ? Why ?

0. Print your name: _____

1. Use a Venn diagram to determine whether or not the following is a valid syllogism:
Islands are surrounded by water.
No man is an island.
Therefore, no man is surrounded by water.

2. Consider the sequence “1,3,5,…” What sort of reasoning is used when you assert that “7 is the next number” ?

3. Use a truth table to determine when if ever the wff $(p \wedge (\neg p)) \rightarrow q$ is true ?

0. Print your name: _____

1. Show that implications are logically equivalent to their contrapositives.

2. Suppose A and B are sets, inside a “universal” set U , with $A \neq \emptyset$, and with $A \subset B$. Draw a Venn diagram and shade in the region $A^c \cap B$.

3. List all the subsets of the set $X = \{c, o, w\}$

0. Print your name: _____

1. You decide to start a Math 110 Lotto by letting people choose three lowercase letters.
(a) How many choices are possible if the order matters and the letters may be repeated ?

(b) How many possible if the order doesn't matter and the letters may not be repeated ?

2. How many 5 card hands (from a standard deck of cards) containing exactly one ace are possible ?

0. Print your name: _____

1. You flip a coin 3 times. What is the probability that you get at least two heads ?

2. You roll two dice. What is the probability that you get a nine ?

3. You draw one card from a deck of cards. What is the probability that you draw either a spade or a picture card ?

0. Print your name:

1. You are dealt 5 cards. What is the probability that they are all of the same suit ?

2. You invent a game, where a player flips three coins. He wins \$4 if he gets all three heads and \$2 if he gets exactly two heads. Is a charge of \$1 to play each time a good or bad business move ? Explain.

3. Your weekly sales commission varies. Twenty percent of the time it is \$150. Fifty percent of the time it is \$40. And the rest of the time it is \$10. Find your expected commission.

0. Print your name:

1. You are dealt 2 cards. What is the probability that the second one is an ace ?

2. A survey of students is taken. One third of the students surveyed are taking Math 110. Ninety percent of those (taking Math 110) love math. Sixty percent of those not taking Math 110 love math. What percentage of the students surveyed love math ?

3. A survey of smokers and non-smokers is taken in a town where very few people smoke. Let A be the event “the person has health problems involving the respiratory system” and B be the event “the person has smoked for fifteen years or more”. Discuss the difference between $P(A \text{ and } B)$ and $P(A \text{ given } B)$. Which is likely to be bigger ? Why ?

0. Print your name: _____

1. Are the events “being single” and “being married” independent ? mutually exclusive ? Justify your answer.

2. You roll 2 dice ten times in a row. Given that each outcome of each roll is independent of the other rolls, find the probability that you never roll a seven. Also find the probability that you get a seven at least once.

3. The company MathCo has three factories, in Mobile, Nirvana, and Podunk. The factory in Mobile produces 50% of the company’s products with a 6% defect rate, Nirvana produces 30% with a 5% defect rate, and Podunk has a 7.5% defect rate. Are the events “being defective” and “being produced in Mobile” independent for MathCo’s products ?

0. Print your name: _____

1. Find the mean, median, and mode of $\{98, 50, 40, 90, 90, 95, 50, 40, 60, 52, 40, 95\}$

2. The company MathCo employs 70 people: 20 math majors and 50 others who didn't major in math (but they all still love math and regularly read math books for fun). The mean salary of the math majors is \$80,000. The mean salary of the others is \$30,000. Find the mean salary of the employees of MathCo.

3. On four previous exams, Lew Zer received the scores of 83, 72, 62, and 80 (all out of 100). Given that the lowest exam score will be dropped, what does Lew have to score on the fifth exam in order to have a mean score of at least a 80 ?

0. Print your name: _____

1. Find the standard deviation of $\{12, 9, 15, 11, 12, 9, 16, 11\}$

2. Suppose Z is the standard normal distribution. Draw a graph and shade the region representing $Z \leq -0.56$. Finally, find the probability $P(Z \leq -0.56)$.

3. Suppose X is the distribution of midterm scores and is normally distributed with mean 66 and standard deviation 12. Find the probability $P(60 \leq X \leq 80)$.

0. Print your name:

1. Suppose $A = \begin{pmatrix} 2 & 4 & 1 \\ 0 & 2 & 6 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & \frac{1}{2} \\ -2 & 2 \\ 10 & 5 \end{pmatrix}$. Find AB .

2. Suppose market research shows that each year 80% of people who use brand X keep using brand X, while the rest switch to brand Y. And 20% of those who use brand Y switch to brand X, with the remainder sticking with brand Y. Find the transition matrix. Suppose initially 60% of people prefer brand X. What will the market breakdown be two years later? Is a 50-50 split an equilibrium? Why or why not?

3. Rewrite the system of equations $\begin{cases} 2x + 3y = 17 \\ 4x + 5y = 39 \end{cases}$ using matrices (don't solve them).