

Math 130

This exciting 100 point, two hour final covers chapters one through six of *Mathematics: A Practical Odyssey* by Johnson and Mowry (plus a little graph theory). Show your work and clearly indicate your answers. All parts of problems are three points unless otherwise indicated.

1. Consider the following set of data

1 3 4 2 3 5 2 4 5 5 3 4 3 3 5 5 1 5 4 5 2 5 4 5 5

- a. Find the mean
 - b. Find the median
 - c. Find the mode
2. Circle the words on the left which apply to the graph on the right.

Euler circuit
Euler path
Hamiltonian circuit
Hamiltonian path
Planar

Euler circuit
Euler path
Hamiltonian circuit
Hamiltonian path
Planar

3. Draw a map that requires four colors to color it.
4. Draw the graph that corresponds to the map you drew in the last problem.

5. Circle yes if the following are statements, otherwise circle no. (1 point each)
- yes no a) The Bettles were the best rock to ever play.
- yes no b) Four squared is fifteen.
- yes no c) The person whose name is on the front of this test [you!] will get an A in this class..

6. Explain the difference between inductive and deductive reasoning.

7. Write the negation of the following statement: **“Dr. Caldwell told us this problem was going to be on the final and I know how to work it.”**

8. Write a truth table to determine if the following argument is valid.

$$\begin{array}{l} p \rightarrow q \\ \sim p \\ \hline \sim q \end{array}$$

9. a) List all subsets of $\{0, 1, 2\}$.
- b) Which of the above subsets are proper?

10. Five hundred students surveyed to see if they took math or science last semester.

227 took math

220 took science

123 took both

How many took neither math or science?

11. There are fifteen students in a class. In how many ways can the teacher choose five to give a group presentation?

12. A jar contains 12 red, 8 black and 10 green jelly beans. If we pick one at random what is the probability that the jelly bean is (1 point each)

a) red

b) not black

c) red and green

d) red or green.

13. Two cards are dealt from a full deck of 52 cards. If we count the ace as high, what is the probability that the cards are both four or less?

14. Suppose David invests \$200,000 for 5 years at 6% interest. Find the future value of this investment if the interest is compounded monthly.
15. Matt wants to save \$200,000 dollars using an ordinary annuity over the next 30 years. The interest rate is 8%. (2 points)
- a) What will the monthly payments be? (Hint: See formula sheet)
- b) What will be the total of Matt's payments? (Hint: How many payments?)
- c) What will be the total interest? (Hint: payment = principal + interest.)
16. Erica bought a house for \$220,000. She put \$20,000 down and obtained an 7% 30 year amortized loan for the rest. Her monthly payment is \$1043.00. (2 points each)
- a) Heather paid one point and \$500 in fees that were included in the finance charge. Find the legal loan amount.
- b) Set up (do not solve) the first equation that you would solve to verify the company's claim that the APR rate is 9.5% (Do not solve.)

17. Stephanie wants to fertilize her backyard. The yard is a triangle with sides 30 feet, 40 feet and 50 feet. If one bag of fertilizer will cover 130 square feet, **how many bags** should she buy? (Hint: Can you buy part of a bag?)
18. A cord of seasoned cedar cost \$220. Robin paid \$250 for a stack that was 3 feet wide, 4 feet tall and 12 feet long. (A cord is 128 cubic feet.) What should **the price** have been?
19. The diameter of the comet Angela is approximately 95 miles and the diameter of Earth's moon is approximately 2,160 miles **How many** comets of this size could fit inside Earth's moon?
20. Suppose you are given a line and a point not on that line. How many parallels to that line can be drawn through the given point? (2 points each)
- in the Euclidean geometry?**
 - in the Riemannian geometry?**
 - in Poincaré's model of Lobachevskian geometry?**