

Math 200  
Form A

Exam II  
Ch 5 & 11

Fall '04

Name \_\_\_\_\_  
Student ID \_\_\_\_\_  
Instructor \_\_\_\_\_  
Section \_\_\_\_\_

There are 10 True-False questions (1 – 10) worth 2 points each. If the statement is true, write 'true' in the blank. If the statement is false, write 'false' in the blank.

There are 10 multiple choice questions (11 – 20) worth 5 points each. For each problem, four possible answers are given, only one of which is correct. You should solve the problem and write the answer in the blank.

There are 2 fill in the blank questions (21 – 22) worth 5 points each. Write the correct answer in the blank. There is no partial credit for these questions.

There are 3 free response questions (23 – 25) worth 5 points each part. In order to obtain full credit for these problems, all work must be shown. Credit will **not** be given for answers not supported by work.

The use of calculators is **NOT** permitted.

You have 75 minutes to complete the exam. Do **not** spend too much time on each problem.

**I. True or False ( 2 points each )**

- \_\_\_\_\_ 1. A number is divisible by 16 if it is divisible by 8 and 2.
- \_\_\_\_\_ 2. If  $p$  and  $q$  are primes, then  $p + q$  can be odd.
- \_\_\_\_\_ 3. The LCM ( 2, 3 ) = GCF ( 6, 42 )
- \_\_\_\_\_ 4. The sum of three consecutive counting numbers has a factor of 3.
- \_\_\_\_\_ 5.  $\frac{(n+1)!}{(n-1)!} = (n+1)(n)$
- \_\_\_\_\_ 6. If a couple had 17 children, the probability that they are all boys is  $1/14$ .
- \_\_\_\_\_ 7. If a coin is tossed and two dice are rolled, there are 12 possible outcomes.
- \_\_\_\_\_ 8. If  $P ( A ) = 1/3$ ,  $P ( B ) = 1/2$  and  $A \cap B = \emptyset$ , then  $P ( A \cup B ) = 1/6$ .
- \_\_\_\_\_ 9.  $P ( B|A ) = \frac{P ( B )}{P ( A )}$
- \_\_\_\_\_ 10. For any event A,  $0 \leq n ( A ) \leq 1$ .

**II. Multiple Choice ( 5 points each )**

11. Find the number of prime factors of 621.
- a) 0
  - b) 1
  - c) 2
  - d) 3
12. Jeff's car gets 18 miles per gallon and Darla's car gets 21 miles per gallon. When traveling the same route from Huntingdon to Blairsville, they both used a whole number of gallons of gas. How far is it from Huntingdon to Blairsville?
- a) 54 miles
  - b) 126 miles
  - c) 189 miles
  - d) 63 miles
13. Find the greatest common factor of 36 and 126. The ***sum of the digits*** of your answer is:
- a) 6
  - b) 9
  - c) 12
  - d) 15

14. The number  $2^3 \cdot 3^a \cdot 11^5$  has 96 factors. Thus  $a$  must be:

- a) 3
- b) 4
- c) 84
- d) 88

15. A jar contains 3 red marbles, 4 white marbles, and 6 blue marbles. Two marbles are drawn **with replacement**. What is the probability that they are the same color?

- a)  $13/72$
- b)  $4/13$
- c)  $48/169$
- d)  $61/169$

16. Which of the following events has a probability of  $35/128$  when tossing **8 coins**?

- a) 7H, 1T
- b) 6H, 2T
- c) 5H, 3T
- d) 4H, 4T

17. The probability that Bash wins the election against Kanny is given to be  $11/18$ . What are the odds that Bash wins?

- a) 11 : 18
- b) 29 : 18
- c) 11 : 29
- d) 11 : 7

18. In a game involving a spinner with 10 equal sections contains 5 red, 3 green, and 2 blue sections. The game consists of spinning twice and costs \$1. If both spins land on the same color, you win \$2. What is the expected value of the payoff for one game?

- a) \$-.43
- b) \$ .38
- c) \$-.24
- d) \$ .66

19. Five cards are dealt at random from an ordinary deck. What is the probability that the 5 cards include exactly four hearts.

- a)  $\frac{{}^{13}C_4}{{}^{52}C_5}$
- b)  $\frac{4}{{}^{52}C_5}$
- c)  $\frac{{}^{16}C_4 \cdot {}^{36}C_1}{{}^{52}C_5}$
- d)  $\frac{{}^{13}C_4 \cdot {}^{39}C_1}{{}^{52}C_5}$

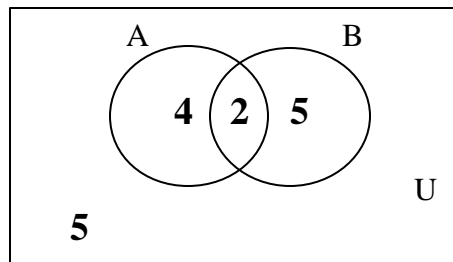
20. How many 5-letter 'words' can be formed from the letters **S W I N G**, if no letter can be repeated and the middle letter is **I**.

- a) 5 !
- b) 12
- c) 24
- d) 40

**III. There is no partial credit given for each of these. ( 5 points each )**

21. Find the number,  $n$  in prime factored form such that  
 $3000 n = 2^{10} \cdot 3^{10} \cdot 5^{10} \cdot 29^{10}$ .

22. The Venn diagram shows a sample space  $S$  with events  $A$  and  $B$ . The number of equally likely outcomes is shown in each part of the diagram. Determine the probability of each of the following events.



- a)  $P(\bar{A}) =$  \_\_\_\_\_
- b)  $P(A \cup B) =$  \_\_\_\_\_
- c)  $P(A|B) =$  \_\_\_\_\_

**IV. Partial Credit.** Do these problems on **this** page.

23. Each student will be assigned an 8 digit alpha-numeric code where no letters or numbers are repeated. How many arrangements are possible where the first three letters are vowels, the next two positions are numbers, and the last three letters are consonants? Leave your answer as a product (but not a fraction).

---

5 pts

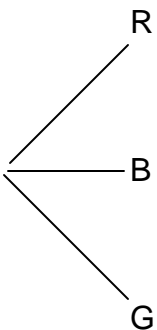
24. Use the Euclidean Algorithm to find the GCF ( 1422, 1665 )

---

5 pts

25. There are 8 cubes in a box: 4 red, 3 blue, and 1 green. Two cubes are drawn consecutively **without** replacement.

- 5 pts a) Continue this weighted probability tree for this experiment **and** assign a probability to each branch.                      b) Find the probability of choosing a red on the second draw.




---

5 pts

**Answer Sheet.** Record all answers for numbers 1 – 22 below.

- |              |   |   |
|--------------|---|---|
| 1. _____     | 1. F  | 23. $5 \cdot 4 \cdot 3 \cdot 10 \cdot 9 \cdot 21 \cdot 20 \cdot 19$ |
| 2. _____     | 2. T  | 24. 9   |
| 3. _____     | 3. T  | 25. $1/2$   |
| 4. _____     | 4. T  |   |
| 5. _____     | 5. T  |   |
| 6. _____     | 6. F  |   |
| 7. _____     | 7. F  |   |
| 8. _____     | 8. F  |   |
| 9. _____     | 9. F  |   |
| 10. _____    | 10. F                                       |   |
| 11. _____    | 11. c                                       |   |
| 12. _____    | 12. b                                       |   |
| 13. _____    | 13. b                                       |   |
| 14. _____    | 14. a                                       |   |
| 15. _____    | 15. d                                       |   |
| 16. _____    | 16. d                                       |   |
| 17. _____    | 17. d                                       |   |
| 18. _____    | 18. c                                       |   |
| 19. _____    | 19. d                                       |   |
| 20. _____    | 20. c                                       |   |
| 21. _____    | 21. $2^7 \cdot 3^9 \cdot 5^7 \cdot 29^{10}$ |   |
| 22. a) _____ | 22. a) $5/8$                                |   |
| b) _____     | b) $11/16$                                  |   |
| c) _____     | c) $2/7$                                    |   |