

MATH 17 NAME \_\_\_\_\_  
 FINAL EXAM STUDENT NUMBER \_\_\_\_\_  
 FALL 2006 INSTRUCTOR \_\_\_\_\_  
 FORM B SECTION NUMBER \_\_\_\_\_

This examination will be machine processed by the University Testing Service. Use only a number 2 pencil on your scantron. On your scantron identify your name, this course (Math 17) and the date. Code and blacken the corresponding circles on your scantron for your student I.D. number and class section number. Code in your test form.

There are 30 multiple choice questions each worth five points. For each problem four possible answers are given, only one of which is correct. You should solve the problem, note the letter of the answer that you wish to give and blacken the corresponding space on the answer sheet. Mark only one choice; darken the circle completely (you should not be able to see the letter after you have darkened the circle). Check frequently to be sure the problem number on the test sheet is the same as the problem number of the answer sheet.

THE USE OF A CALCULATOR, CELL PHONE, OR ANY OTHER ELECTRONIC DEVICE IS NOT PERMITTED IN THIS EXAMINATION.

THE USE OF NOTES OF ANY KIND IS NOT PERMITTED DURING THIS EXAMINATION.

THERE ARE 30 PROBLEMS. CHECK YOUR BOOKLET NOW.

- Write a negation for the statement: "My brother is asleep".
  - My brother is not asleep.
  - My sister is awake.
  - My sister is asleep.
  - The person who is asleep is not my brother.
- Let  $p$  represent the statement "Jello is tasty" and let  $q$  represent the statement "Thursday is rectangular". Translate the symbolic statement  $\sim p \wedge q$  into words.
  - It is not true that jello is tasty and Thursday is rectangular.
  - Jello is not tasty or Thursday is not rectangular.
  - Jello is not tasty and Thursday is not rectangular.
  - Jello is not tasty and Thursday is rectangular.
- Use one of DeMorgan's laws to write the negation of the statement: "The Tigers will win their sectional match or the Wolverines will win by default".
  - The Tigers will not win their sectional match and the Wolverines will win by default.
  - The Tigers will not win their sectional match and the Wolverines will not win by default.
  - The Wolverines will win by default and the Tigers will not win their sectional match.
  - The Tigers will not win their sectional match or the Wolverines will not win by default.

- Let  $p$  represent "I eat too much", let  $q$  represent "I exercise", and let  $r$  represent "The food is good". Write the following compound statement in symbols: "If the food is good and I eat too much, then I exercise".
  - $r \rightarrow (p \wedge q)$
  - $r \wedge (p \rightarrow q)$
  - $(r \wedge p) \rightarrow q$
  - $p \rightarrow (r \wedge q)$
- Write the statement "If your dress needs cleaning, then you drop it off this afternoon", as an equivalent statement that does not use the if... then connective. Remember that  $p \rightarrow q$  is equivalent to  $\sim p \vee q$ .
  - Your dress does not need cleaning or you do not drop it off this afternoon.
  - Your dress needs cleaning and you do not drop it off this afternoon.
  - Your dress does not need cleaning and you do not drop it off this afternoon.
  - Your dress does not need cleaning or you drop it off this afternoon.
- Write the contrapositive of the statement: "If it is love, then it is blind".
  - It is blind if it is love.
  - If it is not blind, then it is not love.
  - If it is blind, then it is love.
  - If it is blind, then it is not love.

- Write the statement "Practice is necessary for making the team" in the form "if  $p$ , then  $q$ ".
  - If you make the team, then you practice.
  - If you don't make the team, then you don't practice.
  - If you do not practice, then you make the team.
  - If you make the team, then you don't practice.
- Use the premises to give a conclusion that yields a valid argument: If you pay taxes, then you are a good citizen. People who do not pay taxes do not receive a tax bill. If it is April, then Mark receives a tax bill.
  - Mark is not a good citizen.
  - Mark did not pay taxes.
  - Mark did not receive a tax bill.
  - Mark is a good citizen.
- Write the negative of the statement  $\forall x[b(x) \rightarrow \sim t(x)]$ .
  - $\exists x[h(x) \rightarrow t(x)]$
  - $\exists x[b(x) \wedge t(x)]$
  - $\exists x[b(x) \vee t(x)]$
  - $\exists x[\sim b(x) \rightarrow t(x)]$

10. Write the statement "Some cats can sing" symbolically where  $c(x)$  means " $x$  is a cat" and  $s(x)$  means " $x$  can sing."

- a)  $\forall x [c(x) \vee s(x)]$
- b)  $\forall x [c(x) \wedge s(x)]$
- c)  $\exists x [c(x) \vee s(x)]$
- d)  $\exists x [c(x) \wedge s(x)]$

11. Let  $U = \{q, r, s, t, u, v, w, x, y, z\}$ ,  $A = \{q, s, u, w, y\}$ , and  $C = \{v, w, x, y, z\}$ . Find  $B' \cap (A \cup C')$

- a)  $\{q, r, s, t, u, v, w, x, y, z\}$
- b)  $\{r, t, u, w\}$
- c)  $\{r, t, u\}$
- d)  $\{q, r, s, t, u, v\}$

12. Bill has 6 friends over for dinner. After dinner, the seven of them are thinking about going out dancing. Not everyone is sure that they want to go. How many subsets of the seven are possible if at least two people go dancing?

- a) 120
- b) 121
- c) 6
- d) 56

13. At East Zone University (Ezu) there are 399 students taking College Algebra or Calculus. 238 are taking College Algebra, 184 are taking Calculus, and 23 are taking both College Algebra and Calculus. How many are taking Algebra but not Calculus?

- a) 215
- b) 161
- c) 192
- d) 376

14. Let  $n(A) = 33$ ,  $n(B) = 15$ ,  $n(A \cup B) = 42$  and  $n(B')$  = 40. Find  $n(A \cap B)$

- a) 36
- b) 13
- c) 49
- d) 42

15. If a single card is drawn from a well-shuffled 52-card deck, find the probability of getting a club.

- a)  $\frac{1}{13}$
- b)  $\frac{1}{4}$
- c)  $\frac{1}{52}$
- d)  $\frac{1}{26}$

16. A spinner has equal regions numbered 1 through 18. What is the probability that the spinner will stop on an even number or a multiple of 3?

- a) 15
- b) 1
- c)  $\frac{1}{3}$
- d)  $\frac{2}{3}$

17. A survey revealed that 50% of people are entertained by reading books, 33% are entertained by watching TV, and 17% are entertained by both books and TV. What is the probability that a person will be entertained by either books or TV?

- a) 17%
- b) 83%
- c) 100%
- d) 66%

18. When two balanced dice are rolled, there are 36 possible outcomes. Find the probability that the second die is 4 or the sum of the dice is 7.

- a)  $\frac{5}{18}$
- b)  $\frac{11}{36}$
- c)  $\frac{1}{36}$
- d)  $\frac{1}{3}$

19. Assuming that boy and girl babies are equally likely, find the probability that a family with four children has all boys given that the first two are boys.

- a)  $\frac{1}{8}$
- b)  $\frac{1}{4}$
- c) 1
- d)  $\frac{1}{2}$

20. Assume that  $E$  and  $F$  are events. Must the union of  $E$  and  $F$  also be an event? Must the intersection of  $E$  and  $F$  also be an event?

- a) Only the intersection must be an event.
- b) Both the union and the intersection must be events
- c) Only the union must be an event.
- d) Neither the union nor the intersection must be an event

21. A shirt company has 3 designs that can be made with short or long sleeves. There are 7 color patterns available. How many different types of shirts are available from this company?

- a) 10 types
- b) 42 types
- c) 12 types
- d) 21 types

22. Suppose a traveler wanted to visit a museum, an art gallery, and the state capitol building. Tours are offered at each attraction hourly from 10a.m. through 3p.m. (6 different hours) In how many ways could the traveler schedule all three tours in one day, with the art gallery being the last tour of the day?
- 40
  - 30
  - 60
  - 10

23. Evaluate  $\binom{s}{4}$ .

- $\frac{s!}{(s-4)!}$
- $s!$
- $\frac{s!}{4!(s-4)!}$
- $\frac{s!}{4!}$

24. If you toss four fair coins, in how many ways can you obtain at least one head?

- 4 ways
- 5 ways
- 15 ways
- 16 ways

25. Two 6-sided dice are rolled. What is the probability the sum of the two numbers on the die will be 6?
- $\frac{1}{6}$
  - $\frac{31}{36}$
  - 1
  - $\frac{5}{36}$

26. A roulette wheel contains 96 slots numbered 1 through 96. The slots 1,4,7,... are red, the slots 2,5,8,... are green, and the slots 3,6,9,... are brown. When the wheel is spun, a ball rolls around the rim and falls into a slot. What is the probability that the ball falls into a green slot?

- $\frac{1}{3}$
- $\frac{2}{3}$
- $\frac{1}{4}$
- $\frac{2}{5}$

27. A family has 5 children. The probability of having a girl is  $\frac{1}{2}$ . What is the probability of having exactly 2 girls and 3 boys?

- $\frac{3}{16}$
- $\frac{2}{5}$
- $\frac{2}{3}$
- $\frac{5}{16}$

28. Find the expected value of the random variable in the following experiment: Three coins are tossed, and the number of tails is noted.

- 1.5
- 1.75
- 2
- 1

29. Suppose you pay \$3.00 to roll a fair die with the understanding that you will get back \$9 for rolling a 3 or a 5, nothing otherwise. What are your expected winnings?

- \$3.00
- \$3.00
- \$9
- \$0

30. Find the probability of getting exactly 7 heads in 8 tosses of a fair coin.

- $\frac{7}{8}$
- 0
- $\frac{8}{2^8}$
- $2^7$

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ITEM NO.	FORM:
1	A
2	D
3	B
4	C
5	D
6	B
7	A
8	D
9	B
10	D
11	B
12	A
13	A
14	C
15	B
16	D
17	D
18	B
19	B
20	B
21	B
22	A
23	C
24	C
25	D
26	A
27	D
28	A
29	D
30	C