

MATH 101

Name (signature) _____

Final Examination

ZID No. _____

Form A

Section _____

May 6, 2004

Instructions:

1. Use a no.2 pencil.
2. Write your last name and initials in the appropriate boxes on the answer form, and fill in the corresponding letter ovals.
3. Write your z number in the appropriate boxes on the answer form, and fill in the corresponding number ovals.
4. Fill in the oval for "Form A" on the answer form.
5. There are 40 questions. It is your responsibility to see you have a complete form.
6. Your answer form and examination copy are to be handed in when you are finished. Sign you examination copy and have your ID ready.
7. Tables and formulas which may be useful are on the last page.

AA

1. A survey of housing costs in a suburban city showed that the average cost of a home was \$132,000 in 2002 and \$157,000 in 2003. The percentage increase this change represents is about
 - (a) 25
 - (b) 1.19
 - (c) .84
 - (d) 18.9
 - (e) 15.9

2. The frequency distribution below indicates the ages of the members of a fraternity at Hopps University.

Age	No. of members
18	16
19	25
20	24
21	20
22	18
25	14

What was the median age for members of this fraternity?

- (a) 19 (b) 20 (c) 25 (d) 20.5 (e) 21

3. Nine typists applying for a job at a bank made the following scores on a timed typing test.

$$\{33, 45, 67, 61, 50, 73, 47, 36, 49\}$$

What is the quartile deviation for this data set?

- (a) 5
 (b) 6
 (c) 7
 (d) 8
 (e) 9

4. A delivery service charges a flat fee plus a mileage fee. If a 5-mile trip costs \$14.50 and a ten-mile trip costs \$22, which of the following systems can be used to find the fees where x = the fixed fee and y = the mileage fee?

(a)
$$\begin{cases} x + 10y = 22 \\ 5y + x = 14.5 \end{cases}$$

(d)
$$\begin{cases} x + y = 2.2 \\ x + y = 2.9 \end{cases}$$

(b)
$$\begin{cases} x + 10y = 22 \\ y + 5x = 14.5 \end{cases}$$

(e)
$$\begin{cases} 10x = 22 \\ 5y = 14.50 \end{cases}$$

(c)
$$\begin{cases} x + y/10 = 22 \\ x + y/5 = 14.5 \end{cases}$$

5. Which of the intervals below contains a zero of the polynomial

$$5x^3 - 22x^2 + 34x - 24 ?$$

- (a) (0,1)
- (b) (1.5,2)
- (c) (2.5,3)
- (d) (2,2.5)
- (e) (1,1.5)

6. You jog $3/4$ mile due north, then jog $1\ 1/2$ miles due east, and then return to your starting point via a straight-line path. How many miles have you jogged?

- (a) 3.93 miles
- (b) 4.5 miles
- (c) 2.81 miles
- (d) 5.06 miles
- (e) 1.68 miles

7. If each number in a data set was multiplied by 4, how would the range of the data set be affected?

- (a) There would be 4 added to it.
- (b) It would not be affected.
- (c) It would be multiplied by 2.
- (d) It would be multiplied by 4.
- (e) There isn't enough information provided to know.

8. In a wildlife sanctuary, 60 birds were captured, tagged, and released. A few weeks later, 36 birds were captured, and 13 of them were found to be tagged. What estimate should they obtain for the size of the population?

- (a) 205 (b) 239 (c) 268 (d) 296 (e) 166

9. Which of the following is NOT a characteristic of a normal distribution?
- (a) The graph of the distribution is symmetric about the line $x = \mu$.
 - (b) The range of the data is about 5σ .
 - (c) About 95% of the data is between $\mu - 2\sigma$ and $\mu + 2\sigma$.
 - (d) The mean, median, and mode are identical.
 - (e) 50% of the data is less than or equal to the mode.
10. A manufacturer discovers that 12% of the staplers she produces are defective. She sent 9 staplers to an office. What is the probability that at most 2 of them were defective?
- (a) .0832 (b) .3655 (c) .9167 (d) .2119 (e) .6354
11. Which of the following is FALSE?
- (a) One way to do a simple random sample is to use a random number table?
 - (b) A good sample should be chosen in an unbiased way.
 - (c) A sample of more than 1,000 people is called a census.
 - (d) A stratified sample occurs when a population is divided into relatively homogeneous groups and the sample reflects that division.
 - (e) The size of a sample should be large enough to reflect the population.
12. A small classroom has three rows labeled A, B, and C, with 5 seats in each row, numbered one through five. What is the probability that a person is seated in a seat numbered 3 or in row C?
- (a) .47 (b) .06 (c) .53 (d) .33 (e) .2
13. The diameter of a tree was .8 inches in 1998 and 1.4 inches in 2001. If the rate of change of the diameter per year is constant, what prediction should be made for the diameter in 2005?
- (a) 1.6 inches
 - (b) 2.2 inches
 - (c) 1.75 inches
 - (d) 2.0 inches
 - (e) 1.9 inches

14. Suppose A is the area of a rectangle which has its length twice its width. Which of the following expressions would be the width?
- (a) $6A$ (b) $A/6$ (c) $\sqrt{A/2}$ (d) $\sqrt{2A}$ (e) $3A$
15. Suppose a researcher using the chi-square statistic with $\alpha = .01$ and $d = 7$ determines $\chi^2 = 18.9$. The researcher should
- (a) increase the number of degrees of freedom
(b) increase the level of significance
(c) not reject the null hypothesis
(d) decrease the number of degrees of freedom
(e) reject the null hypothesis
16. The negation of the statement "All students watch movies" is
- (a) No students miss any monies.
(b) All students do not watch movies.
(c) Some students watch movies.
(d) No students watch movies.
(e) Some students do not watch movies.
17. The minimum value of $y = 2x^2 - 8x + 1$ over the interval $0 \leq x \leq 5$ is
- (a) -5 (b) -7 (c) -8 (d) 1 (e) 11
18. The monthly payment required to pay off a loan of \$3500 over 5 years at an annual interest rate of 7.2% with interest compounded monthly is
- (a) \$69.63
(b) \$712.65
(c) \$48.63
(d) \$2100
(e) \$71.39

19. Which of the following is NOT a stage in Polya's problem solving framework?

- (a) Carrying out the plan.
- (b) Understanding the problem.
- (c) Looking back at the solution.
- (d) Using computer simulation to model the problem.
- (e) Devising a plan to solve the problem.

20. Katie has two recipes for cookies she wants to make. Spice drops use 2 eggs, 2 3/4 cups of flour, and 1/2 cup of brown sugar per batch, while gingies use one egg, 2 cups of flour and 1/2 cup of brown sugar per batch. If she has 4 cups of brown sugar, one dozen eggs, and 10 cups of flour on hand, which system below describes the number of batches of each kind she can make where x = no. of batches of spice drops and y = no. of batches of gingies?

$$(a) \begin{cases} 2x + 2.75y \leq 10 \\ 2x + y \leq 12 \\ x + y \leq 8 \\ x \geq 0, y \geq 0 \end{cases}$$

$$(d) \begin{cases} x + y \leq 8 \\ 2.75x + 2y \leq 10 \\ x \geq 0, y \geq 0 \end{cases}$$

$$(b) \begin{cases} 2y + x \leq 12 \\ 2.75x + 2y \leq 10 \\ x \geq 0, y \geq 0 \end{cases}$$

$$(e) \begin{cases} 2y + x \leq 12 \\ .5x + .5y \leq 4 \\ 2.75x + 2x \leq 10 \\ x \geq 0, y \geq 0 \end{cases}$$

$$(c) \begin{cases} 2x + y \leq 12 \\ .5x + .5y \leq 4 \\ 2.75x + 2y \leq 10 \\ x \geq 0, y \geq 0 \end{cases}$$

21. Bob's VISA card has a 19.8% APR compounded monthly. What is the Annual Percentage Yield (APY) of this credit and agreement?

- (a) 3.3%
- (b) 19.8%
- (c) 21.7%
- (d) 32.7%
- (e) 39.2%

22. An implication statement is always logically equivalent to
- (a) its converse
 - (b) its contrapositive
 - (c) its inverse
 - (d) its negation
 - (e) none of the above
23. The probability that a Horizon cell phone is defective is .2. If you buy two Horizon cell phones, what is the probability that exactly one will be good?
- (a) .32
 - (b) .04
 - (c) .16
 - (d) .50
 - (e) .08

24. The unique solution to the system of equations

$$\begin{cases} 4x + 3y = 3 \\ 2x - 6y = -1 \end{cases}$$

has

- (a) $x = 2/3$
 - (b) $x = 1$
 - (c) $x = 5/6$
 - (d) $x = 1/2$
 - (e) none of the above
25. Consider the following argument:

P1: Julie either studies regularly or watches lots of television.

P2: Julie watches lots of television

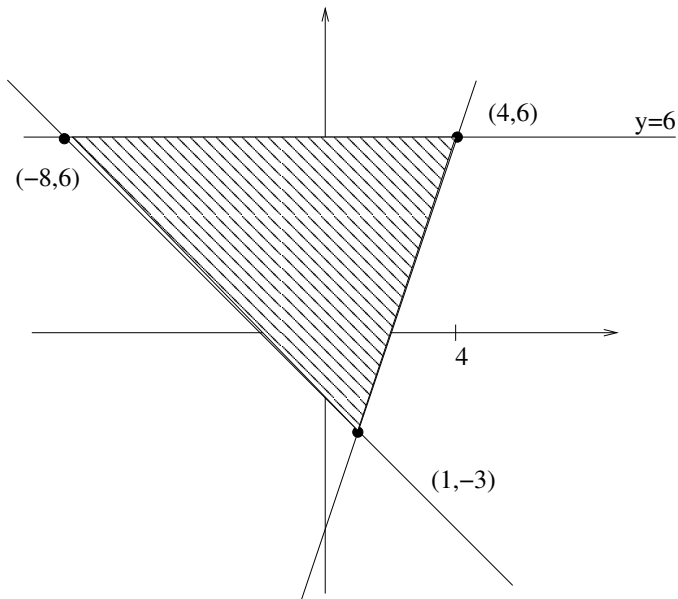
Conclusion: Julie does not study regularly.

This is an example of:

- (a) direct reasoning
- (b) indirect reasoning
- (c) reasoning by transitivity
- (d) reasoning by the “or” rule
- (e) an invalid argument

26. Suppose we know that Matt works on Saturday or he stays out late on Friday night is true. Which of the following cannot be true?
- (a) Matt stays out late on Friday night, and he doesn't work on Saturday.
 - (b) Matt works on Saturday, and he didn't stay out late on Friday night.
 - (c) Matt works on Saturday, or he doesn't stay out late on Friday night.
 - (d) Matt stays out late on Friday night.
 - (e) Matt didn't work on Saturday, and he didn't stay out late on Friday.
27. The mean age of a class of 25 students is 23.4 years. How old would a 26th student have to be for the mean age of the class to be 24.0 years?
- (a) 24.6
 - (b) 28.4
 - (c) 27.5
 - (d) 39
 - (e) 24.3

28. The shaded region below represents the region described by
- $$\begin{cases} x + y \geq -2 \\ 3x - y \leq 6 \\ y \leq 6 \end{cases}$$



The minimum of $x + 4y$ subject to these constraints is

- (a) -11
- (b) 16
- (c) 28
- (d) 32
- (e) 5

29. Reddie's Pizza Bash is famous for its Loads-o-Meat Deluxe Pizza. Which of the following is the best value?
- (a) a 13 inch (diameter) pizza for \$11.75.
 - (b) a 16 inch (diameter) pizza for \$14.75.
 - (c) a 19 inch (diameter) pizza for \$22.75.
 - (d) a 10 inch by 12 inch rectangular pizza for \$9.95.
 - (e) a one foot by one foot square pizza for \$11.50.
30. A survey stated that the interval (75.9, 82.1) was a 95% confidence interval for the percentage of Americans who favored the registration of all firearms. Which of the following is NOT true?
- (a) The mean percentage of all Americans favoring registration could be 80%.
 - (b) There is a .062 probability that the mean percentage of all Americans favoring registration is not in the interval.
 - (c) The mean percentage of all Americans favoring registration could be 62%.
 - (d) There is a .95 probability that the mean percentage of all Americans favoring registration is in the interval.
 - (e) The mean for the percentage in the survey was 79%.
31. What conclusion can be drawn using all of the following premises?
- P1 If Donna has another accident, she will lose her insurance.
 - P2 If Donna shops at Wal-Mart, then she can drive.
 - P3 If Donna loses her insurance, she can't drive.
 - P4 Donna has another car accident.
- (a) Donna lost her insurance.
 - (b) Donna can't drive.
 - (c) Donna did not lose her insurance.
 - (d) If Donna can't drive, then she can't shop at Wal-Mart.
 - (e) Donna can't shop at Wal-Mart.
32. The relative error incurred when 4.2 is rounded to 4 is
- (a) 4.76%
 - (b) 1.05%
 - (c) 95.2%
 - (d) .05%
 - (e) .95%

33. Erick expects that two types of energizer drinks that he sells in his store will be equally popular among teenagers and adults. Below is a table showing the number of 6-packs he sold in the past month for each drink.

	Teens	Adults
Umph	132	64
Power	77	89

- If Erick's hypothesis is correct, how many Umph six-packs should he have expected to sell to adults?
- (a) 35 (b) 64 (c) 83 (d) 110 (e) 132
34. A certain company sells its flour in 20 pound bags. The mean net weight of these bags is 20 pounds with a standard deviation of .5 pounds. If the net weight of these bags is normally distributed, what percentage of the bags have a net weight between 19.4 and 19.6 pounds?
- (a) 9.7% (b) 16.2% (c) 13.8% (d) 18.3% (e) 12.4%
35. A poultry product inspector found that 8% of 400 eggs tested at Eggfield Farms contained salmonella. He also found that 6% of 600 eggs tested at Leghorns Farm contained salmonella. Between the two farms what percentage of eggs contained salmonella?
- (a) 14% (b) 4.8% (c) 7% (d) 8% (e) 6.8%

36. Tall Dudes is a clothing store that specializes in fashions for tall men. Its informal motto is “Our customers are taller than 80% of the rest”. Assuming the heights of men to be normally distributed with a mean of 67 inches and a standard deviation of 5.5 inches, what are the height of Tall Dude’s clientele?

- (a) 72.5 inches or more
- (b) 61.5 inches or more
- (c) 71.4 inches or more
- (d) 62.6 inches or more
- (e) between 67 inches and 71.4 inches

37. The World Almanac Book of Facts 2002 indicated the unemployment rate in the United States for the years 1989, 1994, 1998, 1999, and 2000 as follows:

Year	1989	1994	1998	1999	2000
Rate	5.3%	6.1%	4.5%	4.2%	4.0%

which of the following time periods experienced the largest average rate of change in percentage per year?

- (a) from 1989 to 1994
- (b) from 1994 to 2000
- (c) from 1998 to 1999
- (d) from 1989 to 2000
- (e) from 1998 to 2000

38. If $B^2 - 4AC > 0$ and $A \neq 0$, the quadratic equation $Ax^2 + Bx + C = 0$ has

- (a) no solution
- (b) one solution
- (c) two solutions
- (d) three solutions
- (e) four solutions

39. The size in cells of a bacterial culture at time in minutes from the start of its growth is given by the following table:

Time in minutes	0	10	20	30
No. of Cells	50	141	400	1131

If t is time in minutes and y is the number of cells, which curve below describes the data in the table?

- (a) $y = 1131 + 36(t - 30)$
 - (b) $y = 50(2^{(.714)t})$
 - (c) $y = 141 + 9.1(t - 10)$
 - (d) $y = 50(2^{(.15)t})$
 - (e) $y = 25(2^{(1.15)t})$
40. Josie polled 220 students and found 43 had gone to the men's basketball conference tournament, while 87 had gone to the women's basketball conference tournament. How many students polled had gone to neither tournament?
- (a) 133
 - (b) at least 90
 - (c) at least 130
 - (d) 44
 - (e) at least 177