

Name: _____ Period: _____ Date: _____

NON-CALCULATOR SECTION

Vocabulary: Define each word and give an example.

1. discrete mathematics
2. dependent outcomes
3. series

Short Answer:

4. Describe when to use a combination. Give an example.
5. Describe how to find the sum of a finite geometric sequence.

Review:

6. Use the discriminant to decide whether the equation represents a parabola, ellipse or hyperbola. $-3x^2 + 7xy - 2y^2 - 2x + 3y - 10 = 0$
7. Use the change of base formula to rewrite the logarithm in terms of the common logarithm. $\log_2 17$

15. State an explicit rule for the n th term of the recursively defined sequence:

$$a_n = a_{n-1} + 4.5; a_1 = -11$$

16. Use mathematical induction to prove the statement is true for all positive integers n .

a. $1 + 3 + 6 + \dots + \frac{n(n+1)}{2} = \frac{n(n+1)(n+2)}{6}$

b. $1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 + \dots + n(n+1) = \frac{n(n+1)(n+2)}{6}$

17. The median sales prices (in units of \$10,000) for homes in 29 randomly select metropolitan areas in 2001 were as follows: 10.7, 11.4, 12.7, 11.5, 14.6, 13.6, 9.2, 16.1, 12.2, 13.5, 12.6, 12.0, 14.7, 23.4, 12.4, 17.0, 11.7, 11.5, 10.6, 14.1, 15.4, 15.8, 17.6, 14.7, 11.7, 12.7, 9.1, 16.4, 14.8. Construct a stem plot and describe the distribution's shape.

Name: _____ Period: _____ Date: _____

CALCULATOR SECTION

18. Expand the binomials:

a. $(2x + y)^5$

b. $(4a - 3b)^7$

c. $(3x^2 + y^3)^4$

19. Find the coefficient of the given term in the binomial expansion.

a. x^8 term, $(x - 2)^{11}$

b. x^2y^6 term, $(2x + y)^8$

20. How many different outcomes are possible if you roll two dice and spin a spinner with 5 numbers?

21. How many automobile license plates can be made involving 3 letters followed by 3 digits, if no letters or digits can be repeated?

22. There are 7 people running for elected offices. How many ways can a president, vice president, secretary, and treasurer be selected?

23. A club has 45 members, and its membership committee has three members. How many different membership committees are possible?

24. A business has 35 employees, 21 women and 14 men. How many different employee representative committees are there if the committee must consist of two women and two men?

25. How many different “words” can be made using the letters in the word GERMANY?
(Can you find one that spells the first and last name of a famous actress?)

26. Two 6-sided dice are rolled. What is the probability that the sum is a 2 or a 7?

27. Two 6-sided dice are rolled. What is the probability that the sum will be a 5?

28. Two cans of mixed nuts of different brands are open on a table. Brand A consists of 30% cashews, while brand B consists of 40% cashews. A can is chosen at random, and a nut is chosen at random from the can.
- What is the probability that the nut is a cashew?
 - What is the probability that the nut is from the brand A can, given that it is a cashew?
29. A 5-card hand is dealt from a deck of 52 cards. What is the probability that exactly two are hearts?
30. A 6-card hand is dealt from a deck of 52 cards. What is the probability that they are all from the same suit?
31. According to a college's alumni records, 254 students graduated in 2000. Of these graduates, 172 were women, 124 of whom went on to graduate school. Of the male graduates, 58 went on to graduate school. What is the probability that a 2000 graduate of this college went on to graduate school?
32. Determine whether the infinite geometric series converges or diverges. If it converges, determine the limit. $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$
33. The first row of seating in section J of the Athena Arena has 7 seats. In all, there are 25 rows of seats in section J, each row containing two more seats than the row preceding it. How many seats are in section J?

34. The lengths (in seconds) of 24 randomly selected Beatles songs that appeared on singles are as follows.

Construct a frequency table and a histogram to represent the data. Use intervals of length 10.

143, 120, 120, 139, 124, 144, 131, 132, 148, 163, 140, 177,
136, 124, 179, 131, 180, 137, 156, 202, 191, 197, 230, 190

35. Use this data set. {71, 31, 58, 33, 29, 28, 26, 20, 20, 20, 19, 19, 19, 15, 14, 14, 13, 13, 12, 12}

a. Find the mean.

b. Find the mode.

c. Find the five-number summary.

d. Find the IQR

e. Find the sample standard deviation.

f. Find the variance.

g. Determine if there are any outliers in the data set. Show your work below. No credit for “yes” or “no” without work shown.

h. Draw the boxplot:

36. In 2001, the national mean ACT Math score was 20.7, with an approximate standard deviation of 6. ACT scores in the general population have a normal distribution.
- Approximately what percentage of the 2001 scores were higher than 26.7?
 - Approximately what ACT Math score would one need to make in 2001 to be ranked among the top 2.5% of all who took the test?
37. Suppose that the probability of producing a defective baseball bat is 0.02. Five bats are selected at random. What is the probability that the lot of five bats contains the following?
- No defective bats
 - Exactly one defective bat
 - At least two defective bats