

Problem Set 7

Name: _____

Date: _____

1. Look at the recursive formula.

$$A_1 = 6$$

$$\text{For } n > 1, A_n = A_{(n-1)} + 4$$

What are the first 4 terms of this sequence?

- A. 5, 6, 7, 8 B. 6, 10, 14, 18
C. 9, 12, 15, 18 D. 10, 14, 18, 22

2. This list shows the first four terms of a geometric sequence.

$$4, 2, 1, \frac{1}{2}, \dots$$

Which function can be used to determine the n th term of this sequence?

- A. $f(n) = 4 - 2^n$ B. $f(n) = 4 - 2^{n-1}$
C. $f(n) = 4(\frac{1}{2})^n$ D. $f(n) = 4(\frac{1}{2})^{n-1}$

3. What is the sum of the infinite geometric series

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \dots?$$

- A. 1 B. 1.5 C. 2 D. 2.5

4. In a geometric sequence, $a_1 = 12$ and $r = \sqrt{2}$. What is the *approximate* sum of the first 20 terms of the sequence?

- A. 339.4 B. 8,688.9
C. 29,624.9 D. 29,636.9

5. An auditorium has 30 rows of seats. The first row has 40 seats. The second row has 42 seats. The third row has 44 seats. Each successive row has two more seats than the row before it. How many seats are there in the 30th row?

- A. 70 seats B. 74 seats
C. 98 seats D. 100 seats

6. There are 36 fifth graders in art class. The art teacher wants to arrange their pictures on the wall so that one is in the first row, two are in the second row, three are in the third row, etc. How many rows of pictures will there be?

- A. 8 rows B. 9 rows
C. 10 rows D. 11 rows

7. A bathroom floor has tiles arranged in 9 circles. The innermost circle contains 9 tiles. Each successive circle contains 9 more tiles than the previous circle. How many total tiles are on the bathroom floor?

- A. 81 B. 396 C. 405 D. 729

8. There are 2,500 fish in a pond. Each year the population decreases by 25 percent, but 1,000 fish are added to the pond at the end of the year. Find the population in five years. Also, find the long-term population.

9. The first term of an infinite geometric sequence is 2. The sum of the sequence is 6. What is the common ratio of the sequence?

- A. $\frac{1}{3}$ B. $\frac{2}{3}$ C. $\frac{3}{3}$ D. $\frac{4}{3}$

10. $(3y - 1)^4 =$

- A. $81y^4 - 108y^3 + 54y^2 - 12y + 1$
B. $81y^4 + 108y^3 - 54y^2 - 12y + 1$
C. $81y^4 - 54y^3 - 108y^2 - 12y + 1$
D. $81y^4 + 54y^3 - 108y^2 - 12y + 1$

11. Find the middle term in the expansion of $(x^2 + 2)^{18}$

12. Three balls are randomly drawn from a bag containing 4 white balls and 6 black balls. What is the probability that there are exactly 2 black balls?
- A. $\frac{1}{12}$ B. $\frac{1}{8}$ C. $\frac{1}{6}$ D. $\frac{1}{2}$
13. Five people are to be randomly selected from a group of 9 boys and 7 girls. What is the probability of exactly 3 girls among the 5 people?
- A. $\frac{1}{2496}$ B. $\frac{3}{104}$ C. $\frac{15}{52}$ D. $\frac{33}{104}$
14. If both sexes are equally probable, what is the probability that a family of 5 children has exactly 3 girls?
- A. $\frac{5}{32}$ B. $\frac{5}{16}$ C. $\frac{3}{5}$ D. $\frac{5}{8}$
15. The school table tennis club comprises 6 girls and 8 boys. Two co-captains are appointed. What is the probability that one of these people is a girl?
- A. 0.067 B. $\frac{15}{91}$
 C. 3.33×10^{-4} D. 0.527
16. Two light bulbs are selected at random from a lot of 24, of which 4 are defective. What is the probability that both of the light bulbs are defective?
- A. ≈ 0.022 B. ≈ 0.018
 C. ≈ 0.024 D. ≈ 0.040
17. Patricia has 3 pennies, 6 nickels and 8 dimes in her pocket. If 3 coins are randomly selected, what is the probability of drawing out one of each coin in any order? (Answers are approximate.)
- A. 0.21 B. 0.42 C. 0.29 D. 0.32
18. What is the fourth term in the expansion of $(y - 4)^{11}$?
- A. $10\,560y^8$ B. $42\,240y^8$
 C. $-10\,560y^8$ D. $-42\,240y^8$
19. How many 2-digit whole numbers are there with the units digit being a multiple of 2?
- A. 4 B. 24 C. 32 D. 36
20. A true-false test has 12 questions. John guesses each answer. How many different ways are there for him to answer all the questions?
- A. 24 B. 2048 C. 4096 D. 8192
21. A car license plate consists of 6 characters. The first 3 characters are letters excluding I, O, Q, and U. The last 3 characters are any of the numerals from 0 to 9. How many different license plates are possible?
- A. 96 B. 10,648,000
 C. 17,762,392 D. 20,648,000
22. In how many ways can 4 students from a group of 9 be seated in a row of 4 chairs?
- A. 24 B. 126
 C. 3024 D. 362,880
23. Solve for n .
- $${}_nP_4 = 360$$
- A. 5 B. 7 C. 4 D. 6
24. How many permutations are there of all the letters in KALAMALKA?
- A. 1260 B. 1890
 C. 3780 D. 15,120
25. From a deck of 52 cards, the 12 face cards and 4 aces are removed. From these 16 cards, 4 are chosen. How many combinations are possible that have at least 2 black cards?
- A. 154 B. 784 C. 1232 D. 1302