# Sequences, Series, and the Binomial Theorem

Arithmetic and geometric sequences, series, proof by induction, and binomial expansion.

Name _____ Date _____

32 main · 2-up grid · 12 pages · visible side quests

**Completion Reward**

Shown here as a small pack artifact, not a preview destination.

**1. Which sequence is arithmetic?**

| term number | value |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |
| 4 | 13 |

Check whether each term changes by the same amount from the previous term.

A. 3, 6, 12, 24
B. 1, 4, 9, 16
C. 4, 7, 10, 13
D. 2, 5, 11, 23

1.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

1.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

1.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

1.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

1.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**2. Which sequence is geometric?**

| term number | value |
|---|---|
| 1 | 2 |
| 2 | 6 |
| 3 | 18 |
| 4 | 54 |

Check whether each term is obtained by multiplying by the same factor.

A. 2, 5, 8, 11
B. 1, 3, 6, 10
C. 4, 8, 13, 19
D. 2, 6, 18, 54

2.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

2.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

2.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

2.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

2.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**3. What is the goal of mathematical induction?**

| stage | goal |
|---|---|
| base case | show true at n = 1 |
| inductive step | assume true at k and prove true at k + 1 |

Induction starts with a base case and then proves the truth carries from n = k to n = k + 1.

A. To prove a statement is true for every positive integer in a pattern.
B. To estimate a sequence with a graph.
C. To factor a polynomial.
D. To verify a statement for the first few cases only.

3.1. The goal of mathematical induction is to prove a statement for:

A. one value only
B. all integers in a pattern
C. only negative numbers
D. only even numbers

3.2. After proving the base case, what comes next in induction?

A. assume the statement for k and prove it for k + 1
B. graph the sequence
C. differentiate both sides
D. set n = 0 again

3.3. Binomial coefficients in (a + b)^n count:

A. powers of a only
B. how terms combine in the expansion
C. zeros of the polynomial
D. slopes of a graph

3.4. Pascal's triangle is useful for:

A. graphing logarithms
B. reading binomial coefficients
C. solving inequalities
D. finding asymptotes

3.5. A binomial coefficient like C(5, 2) counts:

A. ordered arrangements
B. ways to choose 2 objects from 5
C. the square of 5
D. the slope of a line

**4. In the expansion of (a + b)^n, what do binomial coefficients count?**

| power | coefficients |
|---|---|
| 2 | 1, 2, 1 |
| 3 | 1, 3, 3, 1 |
| 4 | 1, 4, 6, 4, 1 |

The coefficients record how many ways matching a-and-b products appear in the expansion.

A. The roots of the polynomial
B. The slope of each term
C. How many ways a term can be formed in the expansion
D. The degree drop between terms

4.1. The goal of mathematical induction is to prove a statement for:

A. one value only
B. all integers in a pattern
C. only negative numbers
D. only even numbers

4.2. After proving the base case, what comes next in induction?

A. assume the statement for k and prove it for k + 1
B. graph the sequence
C. differentiate both sides
D. set n = 0 again

4.3. Binomial coefficients in (a + b)^n count:

A. powers of a only
B. how terms combine in the expansion
C. zeros of the polynomial
D. slopes of a graph

4.4. Pascal's triangle is useful for:

A. graphing logarithms
B. reading binomial coefficients
C. solving inequalities
D. finding asymptotes

4.5. A binomial coefficient like C(5, 2) counts:

A. ordered arrangements
B. ways to choose 2 objects from 5
C. the square of 5
D. the slope of a line

**5. What does a recursive formula need besides a recurrence rule?**

| n | a_n |
|---|---|
| 1 | start here |
| 2 | from a_1 |
| 3 | from a_2 |

The rule can only generate new terms after an initial value is given.

A. A determinant
B. A starting value
C. A graph intercept
D. A binomial coefficient

5.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

5.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

5.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

5.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

5.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**6. Which formula matches 10, 13, 16, 19, ...?**

A. a_n = 10(3^(n - 1))
B. a_n = 3 + 10n
C. a_n = 10 + n^2
D. a_n = 10 + 3(n - 1)

6.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

6.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

6.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

6.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

6.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**7. Which formula matches 3, 12, 48, 192, ...?**

A. a_n = 3 + 4(n - 1)
B. a_n = 12(3^(n - 1))
C. a_n = 3(4^(n - 1))
D. a_n = 4(3^(n - 1))

7.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

7.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

7.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

7.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

7.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**8. Which recursive rule matches 4, 9, 14, 19, ...?**

| n | a_n |
|---|---|
| 1 | 4 |
| 2 | 9 |
| 3 | 14 |
| 4 | 19 |

Each new term is the previous term plus the same difference.

A. a_1 = 4, a_n = 5a_(n-1)
B. a_1 = 4, a_n = a_(n-1) + 5
C. a_1 = 9, a_n = a_(n-1) + 4
D. a_1 = 4, a_n = a_(n-1) - 5

8.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

8.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

8.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

8.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

8.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**9. After checking the base case in induction, what comes next?**

A. Assume the statement is true for n = k and prove it for n = k + 1.
B. Plug in random numbers forever.
C. Take a determinant.
D. Check one more example and declare it proven.

9.1. The goal of mathematical induction is to prove a statement for:

A. one value only
B. all integers in a pattern
C. only negative numbers
D. only even numbers

9.2. After proving the base case, what comes next in induction?

A. assume the statement for k and prove it for k + 1
B. graph the sequence
C. differentiate both sides
D. set n = 0 again

9.3. Binomial coefficients in (a + b)^n count:

A. powers of a only
B. how terms combine in the expansion
C. zeros of the polynomial
D. slopes of a graph

9.4. Pascal's triangle is useful for:

A. graphing logarithms
B. reading binomial coefficients
C. solving inequalities
D. finding asymptotes

9.5. A binomial coefficient like C(5, 2) counts:

A. ordered arrangements
B. ways to choose 2 objects from 5
C. the square of 5
D. the slope of a line

**10. A student says 2, 6, 18, 54 is arithmetic because the numbers keep changing. What is the mistake?**

A. Arithmetic sequences must grow faster.
B. Geometric sequences cannot have whole numbers.
C. They should subtract 2 from every term first.
D. The pattern has a constant ratio, not a constant difference.

10.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

10.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

10.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

10.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

10.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**11. Find the next term after 6, 10, 14, 18. Answer with a number.**

11.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

11.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

11.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

11.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

11.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**12. Find the next term after 3, 9, 27, 81. Answer with a number.**

12.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

12.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

12.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

12.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

12.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**13. For a_n = 5 + 3(n - 1), find a_4. Answer with a number.**

13.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

13.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

13.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

13.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

13.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**14. For a_n = 2(4^(n - 1)), find a_3. Answer with a number.**

14.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

14.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

14.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

14.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

14.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**15. Find the sum of the first 4 terms of 2, 5, 8, 11. Answer with a number.**

15.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

15.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

15.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

15.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

15.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**16. Find the sum of the first 4 terms of 1, 2, 4, 8. Answer with a number.**

16.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

16.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

16.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

16.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

16.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**17. What is the coefficient of x in the expansion of (x + 1)^2? Answer with a number.**

17.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

17.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

17.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

17.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

17.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**18. What is the coefficient of x^2 in (x + 1)^3? Answer with a number.**

18.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

18.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

18.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

18.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

18.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**19. For 7, 12, 17, 22, what is the 6th term? Answer with a number.**

19.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

19.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

19.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

19.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

19.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**20. For 2, 6, 18, 54, what is the 5th term? Answer with a number.**

20.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

20.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

20.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

20.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

20.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**21. Find the sum of the first 3 terms of 8, 11, 14, ... Answer with a number.**

21.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

21.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

21.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

21.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

21.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**22. Find the sum of the first 3 terms of 5, 10, 20, ... Answer with a number.**

22.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

22.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

22.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

22.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

22.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**23.** **If a_1 = 3 and a_n = a_(n-1) + 4, what is a_4? Answer with a number.**

23.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

23.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

23.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

23.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

23.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**24.** **If a_1 = 2 and a_n = 3a_(n-1), what is a_4? Answer with a number.**

24.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

24.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

24.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

24.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

24.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**25.** **Write an explicit formula for the sequence 4, 7, 10, 13, ... Answer in the form n = ...**

| n | a_n |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |
| 4 | 13 |

The formula reproduces the same constant-difference table.

25.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

25.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

25.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

25.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

25.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**26. Write an explicit formula for the sequence 5, 10, 20, 40, ... Answer in the form n = ...**

| n | a_n |
|---|---|
| 1 | 5 |
| 2 | 10 |
| 3 | 20 |
| 4 | 40 |

The explicit rule recreates a constant-ratio sequence.

26.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

26.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

26.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

26.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

26.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**27. Expand (x + 2)^2. Answer with an equivalent expression.**

| term | coefficient | power of x |
|---|---|---|
| 1 | 1 | 2 |
| 2 | 2 | 1 |
| 3 | 1 | 0 |

The coefficient row 1, 2, 1 organizes the expansion of a square.

27.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

27.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

27.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

27.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

27.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**28. Expand (x + 1)^3. Answer with an equivalent expression.**

| term | coefficient | power of x |
|---|---|---|
| 1 | 1 | 3 |
| 2 | 3 | 2 |
| 3 | 3 | 1 |
| 4 | 1 | 0 |

The row 1, 3, 3, 1 tracks the combined terms in a cube expansion.

28.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

28.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
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28.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
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28.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

28.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**29. Write an explicit formula for 2, 6, 10, 14, ... Answer in the form n = ...**

29.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

29.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

29.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

29.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

29.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**30. Write an explicit formula for 7, 21, 63, 189, ... Answer in the form n = ...**

30.1. Which sequence is arithmetic?

A. 2, 5, 8, 11
B. 3, 6, 12, 24
C. 1, 4, 9, 16
D. 2, 4, 7, 11

30.2. Which sequence is geometric?

A. 4, 8, 12, 16
B. 2, 6, 18, 54
C. 5, 9, 13, 17
D. 1, 3, 6, 10

30.3. A recursive sequence formula needs a recurrence rule and:

A. a graph
B. an initial term
C. the slope
D. an intercept

30.4. An explicit formula for a sequence lets you find:

A. any term directly from n
B. only the next term
C. only the first term
D. the slope of the sequence

30.5. For a_n = 4 + 2(n - 1), what is a_5?

A. 10
B. 12
C. 14
D. 16

**31. Expand (x - 3)^2. Answer with an equivalent expression.**

31.1. The goal of mathematical induction is to prove a statement for:

A. one value only
B. all integers in a pattern
C. only negative numbers
D. only even numbers

31.2. After proving the base case, what comes next in induction?

A. assume the statement for k and prove it for k + 1
B. graph the sequence
C. differentiate both sides
D. set n = 0 again

31.3. Binomial coefficients in (a + b)^n count:

A. powers of a only
B. how terms combine in the expansion
C. zeros of the polynomial
D. slopes of a graph

31.4. Pascal's triangle is useful for:

A. graphing logarithms
B. reading binomial coefficients
C. solving inequalities
D. finding asymptotes

31.5. A binomial coefficient like C(5, 2) counts:

A. ordered arrangements
B. ways to choose 2 objects from 5
C. the square of 5
D. the slope of a line

**32. Expand (x - 1)^3. Answer with an equivalent expression.**

32.1. The goal of mathematical induction is to prove a statement for:

A. one value only
B. all integers in a pattern
C. only negative numbers
D. only even numbers

32.2. After proving the base case, what comes next in induction?

A. assume the statement for k and prove it for k + 1
B. graph the sequence
C. differentiate both sides
D. set n = 0 again

32.3. Binomial coefficients in (a + b)^n count:

A. powers of a only
B. how terms combine in the expansion
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32.4. Pascal's triangle is useful for:

A. graphing logarithms
B. reading binomial coefficients
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32.5. A binomial coefficient like C(5, 2) counts:

A. ordered arrangements
B. ways to choose 2 objects from 5
C. the square of 5
D. the slope of a line