Worksheet A – Arithmetic & mixed sequences

Name: _____ **Date:** _____ **Period:** _____

First listed term is at n = 1 unless stated.

1. Classify the sequence as arithmetic, geometric, or neither. Give the common difference or ratio if applicable. 19, 13, 7, 1, …

2. Classify the sequence as arithmetic, geometric, or neither. Give the common difference or ratio if applicable. 7, 14, 28, 56, …

3. Classify the sequence as arithmetic, geometric, or neither. Give the common difference or ratio if applicable. 27, 9, 3, 1, …

4. Classify the sequence as arithmetic, geometric, or neither. Give the common difference or ratio if applicable. $\frac{2}{5}$, $\frac{6}{5}$, 2, $\frac{14}{5}$, …

5. Classify the sequence as arithmetic, geometric, or neither. Give the common difference or ratio if applicable. 2, 3, 5, 8, 13, …

6. Classify $b_n = \frac{(n+5)}{3}$.

7. Write the first five terms: $a_n = 9 + 4n$

8. Write the first five terms: $a_n = 3^{n-1}$

9. Write the first five terms: $a_n = 95 - 6n$

10. Write the first five terms: $a_n = \frac{n}{n+3}$

11. Write the first five terms: $a_n = 7 + (-1)^n$

12. Write an explicit rule and find term 36: 23, 31, 39, 47, …

13. Write an explicit rule and find term 52: 11, 7, 3, -1, …

14. Write an explicit rule and find term 31: $\frac{13}{10}, \frac{8}{5}, \frac{19}{10}, \frac{11}{5}, \ldots$

15. Given a_k at $k = 12$: $a_k = 18$, $d = -9$. Write an explicit rule and find term 17.

16. Given a_k at $k = 5$: $a_5 = -7$, $d = \frac{3}{4}$. Write an explicit rule and find term 12.

17. Given a_k at $k = 16$: $a_{16} = 42$, $d = 6$. Write an explicit rule and find term 11.

18. Given a_k at $k = 14$: $a_{14} = -29$, $d = -5$. Write an explicit rule and find term 10.

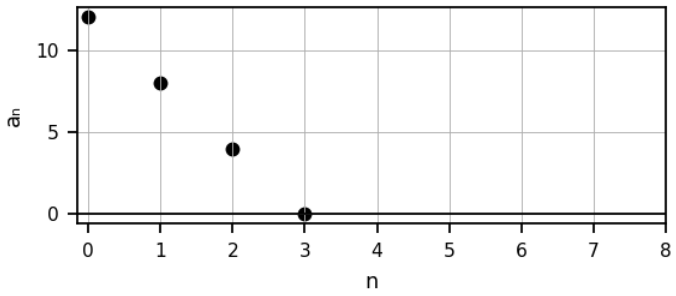
19. Write an explicit equation using the initial value at $n = 0$: $-48, -36, -24, -12, \ldots$

20. Write an explicit equation using the initial value at $n = 0$: $28, 25, 22, 19, \ldots$

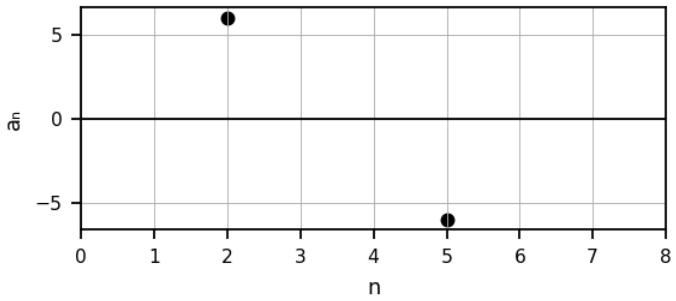
21. Given $a_3 = 9$ at $k = 3$ and $a_7 = 21$ at $k = 7$, write an explicit rule and find term 13.

22. Given $a_2 = -4$ at $k = 2$ and $a_8 = -13$ at $k = 8$, write an explicit rule and find term 12.

23. Use the plotted sequence to write an explicit rule and find term 10.



24. Use the plotted sequence to write an explicit rule and find term 10.



25. Select all equations representing 5, 12, 19, 26, ... (first term at $n = 1$).

I. $7n - 2$ II. $7n + 5$ III. $5 + 7(n - 1)$ IV. $12 + 7(n - 2)$

26. Classify and find the next two terms (assume the simplest indicated pattern): 3, 5, 8, 12, ...

27. The first bus stop is at 6:15 A.M. Stops are 3 minutes apart. When is the 16th stop?

28. A savings account starts with \$360 at week 0. Add \$35 each week. (a) Write a rule and the first five balances starting at week 0. (b) Find the balance after 24 weeks.

29. A stack has 24 logs on the bottom, then 23, decreasing by one per layer until the top has one. How many logs are in the stack?

30. A math club has 28 tutors in year 1 and adds 6 each year. (a) Write a rule. (b) List the first five terms. (c) Find the number in year 18.

31. A cart moves at constant speed. Use the table to write a rule and predict distance at 12 seconds.

Time (s)	1	2	3	4
Distance (m)	12.5	20.0	27.5	35.0

32. An arena has 18 seats in row 1 and 22 in row 2. The number increases by the same amount. How many seats are in row 19?

Worksheet B – Geometric & mixed sequences

Name: _____ **Date:** _____ **Period:** _____

First listed term is at n = 1 unless stated.

1. Classify the sequence as arithmetic, geometric, or neither. Give the common difference or ratio if applicable. 81, -27, 9, -3, …

2. Classify the sequence as arithmetic, geometric, or neither. Give the common difference or ratio if applicable. $\frac{7}{10}, \frac{7}{100}, \frac{7}{1000}, \frac{7}{10000}, \ldots$

3. Classify the sequence as arithmetic, geometric, or neither. Give the common difference or ratio if applicable. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \ldots$

4. Classify the sequence as arithmetic, geometric, or neither. Give the common difference or ratio if applicable. 34, 41, 48, 55, …

5. Write an explicit equation using k = 0: 40, 8, $\frac{8}{5}, \frac{8}{25}, \ldots$

6. Write an explicit equation using k = 0: $\frac{3}{4}$, 3, 12, 48, ...

7. Write an explicit equation using k = 2: 125, 25, 5, 1, ...

8. Write an explicit equation using k = 4: $\frac{1}{2}$, 3, 18, 108, ...

9. Given $g_1 = 7$, $r = -3$. Write an explicit rule and the first five terms.

10. Given $g_1 = \frac{1}{200}$, $r = 4$. Write an explicit rule and the first five terms.

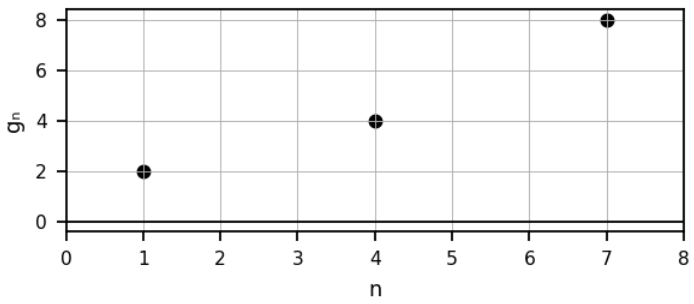
11. Given $g_1 = 15$, $r = \frac{-1}{3}$. Write an explicit rule and the first five terms.

12. Given $g_1 = 4096$, $r = \frac{1}{4}$. Write an explicit rule and the first five terms.

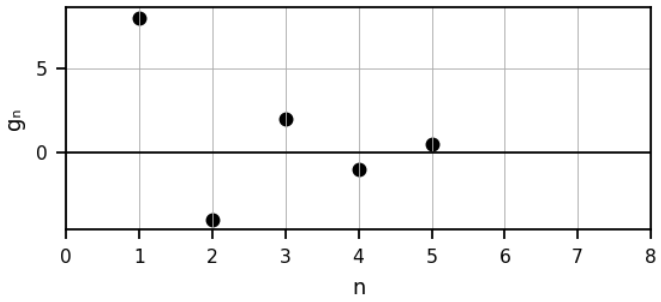
13. Given $g_{2} = 2$ at $k = 2$ and $g_{5} = 128$ at $k = 5$, write an explicit rule and find term 7.

14. Given $g_{3} = -18$ at $k = 3$ and $g_{6} = \frac{16}{3}$ at $k = 6$, write an explicit rule and find term 8.

15. Use the plotted sequence to write an explicit rule and find term 7.



16. Use the plotted sequence to write an explicit rule and find term 6.



17. Select all equations representing 9, 3, 1, … (first term at n = 1).

I. $27(\frac{1}{3})^n$ II. $9(\frac{1}{3})^n$ III. $9(\frac{1}{3})^{n-1}$ IV. $3(\frac{1}{3})^{n-3}$

18. Find the missing geometric mean (positive ratio): 48, □, 3.

19. Find the missing geometric mean (positive ratio): 18, □, $\frac{225}{2}$.

20. Find the missing geometric mean (positive ratio): 25, □, 36.

21. Find the missing geometric mean (positive ratio): $\frac{4}{7}$, □, $\frac{16}{63}$.

22. Find the three missing terms of the geometric sequence (positive ratio): 1296, □, □, □, 1.

23. Find the three missing terms of the geometric sequence (positive ratio): 16, □, □, □, 81.

24. Find the three missing terms of the geometric sequence (positive ratio): $\frac{1}{16}$, □, □, □, 1.

25. Find the three missing terms of the geometric sequence (positive ratio): $\frac{3}{4}$, □, □, □, $\frac{3}{64}$.

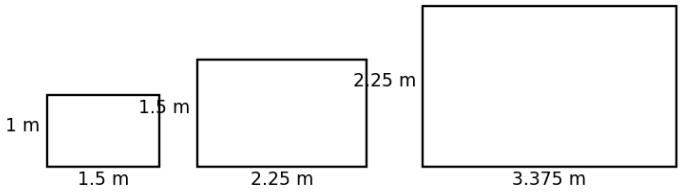
26. Classify and find the next two terms (assume the simplest indicated pattern): 12, −24, 48, −96, …

27. Classify and find the next two terms (assume the simplest indicated pattern): 31, 37, 43, 49, …

28. For 5, 15, 45, 135, … write the nth-term rule and find terms 6, 9 and 12.

29. A balloon contains 3,200 in^3 of helium on day 1 and loses 25% each day. (a) List the first five daily volumes. (b) Find r. (c) Find the volume on day 9.

30. Find the perimeter of rectangle 7 in the pattern shown.



31. A vehicle costs $48,000 and depreciates 18% each year. (a) Write a value model. (b) Find value after 6 years. (c) Find the first whole year when value is below $17,000.

32. Deposit $4,200 once into an account earning 7.2% annual interest compounded monthly. (a) Write the monthly balance. (b) When does it first exceed $18,000? (c) Find the balance after 25 years.

33. Deposit $320 at the beginning of every month into an account earning 6% annually, compounded monthly. The end-of-month balance is the sum $320(1.005) + \ldots + 320(1.005)^n$. (a) Write a rule. (b) When does the balance exceed $12,000? (c) Find the balance after 20 years.

34. A substance has mass 900 g at hour 0 and 324 g at hour 2. Assume positive geometric decay. Find the mass at hours 1, 3 and 4.

35. Starting salary is $42,000 in year 1, with a 4% raise each year. Find salary in year 7.

36. A tree farm has 8,000 trees in year 0 and harvests 15% each year. Write a model and predict the first four annual counts (nearest whole tree).

37. A ball falls from 24 ft and rebounds to 70% of its previous height. (a) List heights for bounces 1–5. (b) Write the nth bounce height. (c) First bounce below 1 ft? (d) Total distance through landing after bounce 8?