

Sequences

Multiple Choice

Identify the choice that best completes the statement or answers the question.

Describe the pattern in the sequence. Find the next three terms.

- _____ 1. 13, 15, 17, 19, ...
a. Add 2; 23, 25, 27.
b. Multiply by 2; 38, 76, 152.
c. Add -2; 17, 15, 13.
d. Add 2; 21, 23, 25.
- _____ 2. 4, 8, 16, 32, ...
a. Multiply by 2; 64, 128, 256.
b. Multiply by -2; -64, 128, -256.
c. Multiply by 2; 128, 256, 512.
d. Add 2; 34, 36, 38.
- _____ 3. 1, 2, 6, 16, 44, ...
a. Add the two previous terms and then multiply by 2; 120, 328, 896
b. Multiply by 2 and then add 4; 92, 188, 380
c. Alternate multiplying by 2 and by 3; 88, 264, 528
d. Add all the previous terms; 69, 138, 276
- _____ 4. 625, 250, 100, 40, ...
a. Divide by 3; 15, 5, 1.
b. Divide by 2.5; 16, 6.4, 2.56.
c. Add 7.5; 25, 32.5, 51.25.
d. Subtract 15; 10, -5, -20.
- _____ 5. Suppose you drop a tennis ball from a height of 15 feet. After the ball hits the floor, it rebounds to 85% of its previous height. How high will the ball rebound after its third bounce? Round to the nearest tenth.
a. 9.2 feet b. 10.8 feet c. 7.8 feet d. 1.9 feet
- _____ 6. Orlando is making a design for a logo. He begins with a square measuring 24 inches on a side. The second square has a side length of 19.2 inches, and the third square has a side length of 15.36 inches. Which square will be the first square with a side length of less than 12 inches?
a. fourth square c. sixth square
b. fifth square d. seventh square
- _____ 7. Write a recursive formula for the sequence 8, 10, 12, 14, 16, Then find the next term.
a. $a_n = a_{n-1} + 2$, where $a_1 = 8$; 18
b. $a_n = a_{n-1} + 2$, where $a_1 = 18$; 8
c. $a_n = a_{n-1} - 2$, where $a_1 = 8$; 18
d. $a_n = a_{n-1} - 2$, where $a_1 = 2$; -2
- _____ 8. Write a recursive formula for the sequence 15, 26, 48, 92, 180, Then find the next term.
a. $a_n = 2a_{n-1} - 4$, where $a_1 = 15$; 356
b. $a_n = 2a_{n-1} - 4$, where $a_1 = 15$; 356
c. $a_n = 4 + 11 \cdot 2^{n-1}$, where $a_1 = 15$; 356
d. $a_n = 3a_{n-1} - 19$, where $a_1 = 15$; 356

- ___ 9. Is the formula $a_n = -4n(n - 1)$ is *explicit* or *recursive*? Find the first five terms of the sequence.
- a. recursive; 1, -4, 16, -64, 256 c. explicit; 1, -4, 16, -64, 256
 b. recursive; 0, -16, -24, -48, -80 d. explicit; 0, -8, -24, -48, -80

Is the sequence arithmetic? If so, identify the common difference.

- ___ 10. 13, 20, 27, 34, ...
 a. yes, 7 b. yes, -7 c. yes, 13 d. no
- ___ 11. 14, 21, 42, 77, ...
 a. yes, 7 b. yes, -7 c. yes, 14 d. no
- ___ 12. Viola makes gift baskets for Valentine's Day. She has 13 baskets left over from last year, and she plans to make 12 more each day. If there are 15 work days until the day she begins to sell the baskets, how many baskets will she have to sell?
 a. 193 baskets c. 205 baskets
 b. 156 baskets d. 181 baskets
- ___ 13. Find the 50th term of the sequence 5, -2, -9, -16, ...
 a. -352 b. -343 c. -338 d. -331
- ___ 14. Find the missing term of the arithmetic sequence 22, \square , 34, ...
 a. 46 b. 16 c. 28 d. 40
- ___ 15. A grocery clerk sets up a display of 12-pack cartons of cola. There are 15 cartons at the base of the triangle and one at the top. How many cartons of cola are needed for the complete display?



- a. 180 cartons c. 120 cartons
 b. 30 cartons d. 15 cartons

Is the sequence geometric? If so, identify the common ratio.

- ___ 16. 6, 12, 24, 48, ...
 a. yes, 2 b. yes, -2 c. yes, 4 d. no
- ___ 17. 2, -4, -16, -36, ...
 a. yes, -2 b. yes, 2 c. yes, -3 d. no
- ___ 18. $\frac{1}{3}, \frac{2}{9}, \frac{4}{27}, \frac{8}{81}, \frac{16}{243}, \dots$
 a. yes, $\frac{2}{3}$ c. yes, $\frac{1}{6}$
 b. yes, $\frac{1}{9}$ d. not geometric

Write the explicit formula for the sequence. Then find the fifth term in the sequence.

- ___ 19. $a_1 = 3, r = -3$
- a. $a_n = 3 \cdot (-3)^{n-1}; 243$ c. $a_n = 3 \cdot (3)^n; 243$
b. $a_n = -3 \cdot (3)^{n-1}; -243$ d. $a_n = 3 \cdot (-3)^n; -729$
- ___ 20. $a_1 = 120, r = 0.3$
- a. $a_n = 120 \cdot (0.3)^n; 0.2916$ c. $a_n = 120 \cdot (0.3)^n; 0.972$
b. $a_n = a_{n-1} \cdot 0.3; 0.2916$ d. $a_n = 120 \cdot (0.3)^{n-1}; 0.972$

Find the missing term of the geometric sequence.

- ___ 21. 45, \square , 1620, ...
- a. 9720 b. 51 c. 6 d. 270
- ___ 22. 1250, \square , 50, ...
- a. 1200 b. 650 c. 250 d. 125
- ___ 23. Kaylee is painting a design on the floor of a recreation room using equilateral triangles. She begins by painting the outline of Triangle 1 measuring 50 inches on a side. Next, she paints the outline of Triangle 2 inside the first triangle. The side length of Triangle 2 is 80% of the length of Triangle 1. She continues painting triangles inside triangles using the 80% reduction factor. Which triangle will first have a side length of less than 29 inches?
- a. Triangle 4 c. Triangle 5
b. Triangle 3 d. Triangle 6
- ___ 24. A rope is swinging in such a way that the length of the arc is decreasing geometrically. If the first arc is 18 feet long and the third arc is 8 feet long, what is the length of the second arc?
- a. 12 feet b. 10 feet c. 5 feet d. 72 feet

Short Answer

25. Consider the sequence 8, 6, 3, -1, -6, ...
- a. Find the next two terms of the sequence.
b. Write an explicit formula for the sequence.
c. Write a recursive formula for the sequence.

Essay

26. The table shows how the number of sit-ups Marla does each day has changed over time. At this rate, how many sit-ups will she do on Day 12? Explain your steps in solving this problem.

Day 1	Day 2	Day 3	Day 4	Day 5
28	33	38	43	48

Other

27. Consider the sequence $-7, -5.6, -4.2, -2.8, -1.4, \dots$
- Write an explicit formula for the sequence. Explain your steps.
 - Write a recursive formula for the sequence. Explain your steps.
 - Suppose you need to find the 50th term of the sequence. Explain which formula you would use.
 - Which term is the number 103.6? Explain your method for solving this problem.