

# Classroom Voting Questions: Precalculus

## Sequences and Series

1. If the general term for a sequence is  $a_n = 4 + 6n$  then
  - (a)  $a_3 = 10$
  - (b)  $a_3 = 16$
  - (c)  $a_3 = 22$
  - (d)  $a_3 = 28$
  
2. Given the sequence  $0, 2, 4, 6, 8, \dots$ , what is the  $a_n$ , noting that  $a_0 = 0$ ?
  - (a)  $a_n = n + 2$
  - (b)  $a_n = 2^n$
  - (c)  $a_n = n^2$
  - (d)  $a_n = 2n$
  
3. **True or False** The sequences  $0, 2, 4, 6, 8, \dots$  and  $2, 4, 6, 8, \dots$  have the same  $n^{\text{th}}$  term.
  - (a) True, and I am very confident
  - (b) True, but I am not very confident
  - (c) False, but I am not very confident
  - (d) False, and I am very confident
  
4. Given the sequence  $15, 30, 60, 120, 240, \dots$ , what is the  $a_n$ , noting that  $a_0 = 15$ ?
  - (a)  $a_n = n + 15$
  - (b)  $a_n = 2^n$
  - (c)  $a_n = 2^n(15)$
  - (d)  $a_n = n^2$
  - (e)  $a_n = 2n$
  - (f) None of the above
  
5. Given the sequence  $10, 7, 4, 1, -2, \dots$ , what is the  $a_n$ , noting that  $a_0 = 10$ ?

- (a)  $a_n = n - 3$
- (b)  $a_n = 3 - n$
- (c)  $a_n = 10 - n$
- (d)  $a_n = 10 - 3n$
- (e) None of the above

6. Which of the following represents the general term for the sequence  $7, 5, 7, 5, 7 \dots$ ?

- (a)  $a_n = 6 - (-1)^n$
- (b)  $a_n = 6 + (-1)^n$
- (c)  $a_n = 7 - 2n$
- (d)  $a_n = 5 + (-2)^n$

7. What will we get if we add up the infinite series of numbers:  $16 + 8 + 4 + 2 + 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$ ?

- (a) This infinite sum will reach a number less than 32.
- (b) This infinite sum is equal to 32.
- (c) This infinite sum will reach a number greater than 32.
- (d) Because we're adding up an infinite number of numbers which are all greater than zero, the sum diverges to infinity.

8. What will we get if we add up the infinite series of numbers:  $12 + 4 + \frac{4}{3} + \frac{4}{9} + \frac{4}{27} + \dots$ ?

- (a) This infinite sum will converge to a number less than 18.
- (b) This infinite sum is equal to 18.
- (c) This infinite sum will converge a number between 18 and 19.
- (d) This infinite sum will converge a number greater than 19.
- (e) This infinite sum diverges to infinity.

9. What will we get if we add up the infinite series of numbers:  $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \dots$ ?

- (a) This infinite sum will converge to  $1/2$ .
- (b) This infinite sum will converge to  $2/3$ .
- (c) This infinite sum will converge to 2.
- (d) This is not a geometric series.

10. What will we get if we add up the first 10 terms in the series:  $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \dots$ ?
- (a) 0.663
  - (b) 0.664
  - (c) 0.666
  - (d) 0.667
  - (e) 0.668
11. What is  $\sum_{j=1}^5 4j$ ?
- (a) 15
  - (b) 20
  - (c) 40
  - (d) 60
12. Which of the following series is not geometric?
- (a)  $\sum_{n=0}^{\infty} \frac{15}{3^n}$
  - (b)  $\sum_{n=5}^{\infty} 12^{2n+4}$
  - (c)  $\sum_{n=1}^{\infty} 9^{-n}$
  - (d)  $\sum_{n=1}^{\infty} 4^{1/n}$
  - (e)  $\sum_{n=0}^{\infty} \frac{5 \cdot 3^n}{7^{3n}}$
  - (f) More than one of these is not geometric.
13. Which of the following geometric series converge?
- (a)  $\sum_{n=0}^{\infty} \frac{8}{(-2)^n}$
  - (b)  $\sum_{n=5}^{\infty} 6^{3n+2}$
  - (c)  $\sum_{n=1}^{\infty} (-4)^{-n}$
  - (d)  $\sum_{n=0}^{\infty} \frac{6 \cdot 2^n}{6^{3n}}$
  - (e) Exactly two of these converge.
  - (f) Exactly three of these converge.
14. True or False: The sequence whose  $n$ th term  $a_n$  is given by  $a_n = 3n - 1$  is arithmetic.
- (a) True, and I am very confident.

- (b) True, but I am not very confident.  
(c) False, but I am not very confident.  
(d) False, and I am very confident.
15. True or False: The sequence whose  $n$ th term  $a_n$  is given by  $a_n = n^2 + 1$  is arithmetic.
- (a) True, and I am very confident.  
(b) True, but I am not very confident.  
(c) False, but I am not very confident.  
(d) False, and I am very confident.
16. Write the formula for the  $n$ th term of the sequence 5, 8, 11, 14, ..., where  $n \geq 1$ .
- (a)  $a_n = 5n + 3$   
(b)  $a_n = 5 + 3n$   
(c)  $a_n = 3n + 2$   
(d)  $a_n = 2n + 3$
17. Suppose that you want to sign up for a home security system. Company A offers the following deal: Your initial payment for the cost of the equipment, installation and the first month of monitoring is \$600. Each month thereafter you pay \$30 to have your system monitored. Which of the following is a formula for the total amount you have paid by the  $n$ th payment,  $n \geq 1$ ?
- (a)  $a_n = 30n + 600$   
(b)  $a_n = 30n + 570$   
(c)  $a_n = 30n + 599$   
(d)  $a_n = 30n$
18. Suppose that you compare the offer from the previous problem with another company. Company B offers the equipment, installation and the first month of monitoring for only \$200, but each month thereafter you pay \$40 for the monitoring fee. Which of the following is a formula for the total amount you have paid by the  $n$ th payment,  $n \geq 1$ ?
- (a)  $a_n = 40n + 160$   
(b)  $a_n = 40n + 200$   
(c)  $a_n = 40n + 199$

(d)  $a_n = 40n$

19. At first, Company B's offer seems attractive with its low initial payment, but then you realize that there may be more to it than that since their monitoring fee is higher. Will Company B's offer eventually become more expensive than Company A's? If so, when?

(a) Company B will always be cheaper.

(b) At the 41st payment, Company B's offer will be more expensive than Company A's offer.

(c) At the 42nd payment, Company B's offer will be more expensive than Company A's offer.

(d) Company B will always be more expensive.

20. Find the 20th partial sum of the sequence  $a_n = 3n - 1$ , where  $n \geq 1$ .

(a) 610

(b) 59

(c) 20

(d) 1220

21. True or False: The sequence whose  $n$ th term is  $a_n = \left(\frac{3}{4}\right)^n$  is geometric.

(a) True, and I am very confident.

(b) True, but I am not very confident.

(c) False, but I am not very confident.

(d) False, and I am very confident.

22. True or False: The sequence whose  $n$ th term is  $a_n = \left(\frac{3}{4}\right)^n + 1$  is geometric.

(a) True, and I am very confident.

(b) True, but I am not very confident.

(c) False, but I am not very confident.

(d) False, and I am very confident.

23. Represent the annual salary of someone with a starting salary of \$50,000 that increases by 3% each year with a geometric sequence  $a_n$ , where  $n \geq 1$ .

(a)  $a_n = 50,000(1.03)^{n-1}$

(b)  $a_n = 50,000(.03)^{n-1}$

(c)  $a_n = 50,000(1.03)^n$

(d)  $a_n = 50,000(.03)^n$