

Brett Robbins Academic Consulting

Mathematics 20-1 Practice Test

Unit 1: Sequences and Series

25 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

The common difference of the arithmetic sequence 7, 13, 19, 25, ... is

- A) 5
B) 20
C) 6
D) 7

Question 2

An arithmetic sequence has first term 4 and common difference 3.

The general term of the sequence is

- A) $t_n = 3n + 4$ B) $t_n = 4n + 3$
C) $t_n = 3n - 1$ D) $t_n = 3n + 1$

Question 3

The 15th term of the arithmetic sequence 3, 8, 13, ... is

- A) 73
B) 68
C) 78
D) 75

Question 4

The 6th term of the geometric sequence 5, 15, 45, ... is

- A) 405 B) 3645
C) 243 D) 1215

Question 5

The sum of the first 20 terms of the arithmetic sequence 2, 5, 8, ... is ____.

Question 6

An arithmetic sequence has $t_1 = 9$ and common difference -2 .

If $t_n = -31$, then the value of n is

- A) 19
- B) 21
- C) 20
- D) 22

Question 7

The two arithmetic means between 8 and 29 are

- A) 13 and 20
- B) 14 and 21
- C) 15 and 22
- D) 16 and 23

Question 8

The sum of the first 6 terms of the geometric series $3 + 6 + 12 + \dots$ is

- A) 189
- B) 96
- C) 381
- D) 192

Question 9

The sum of the infinite geometric series with $t_1 = 12$ and common ratio $\frac{1}{4}$ is

- A) undefined, since the series diverges
- B) 9
- C) 15
- D) 16

Question 10

A ball is dropped from a height of 12 m. Each time it bounces, it rebounds to $\frac{3}{4}$ of its previous height. The total distance travelled by the ball, in metres, until it comes to rest is _____.

Question 11

In an arithmetic sequence, $t_4 = 17$ and $t_{10} = 41$.

The first term of the sequence is

- | | |
|------|------|
| A) 3 | B) 7 |
| C) 5 | D) 9 |

Question 12

The number of terms of the arithmetic series $3 + 7 + 11 + \dots$ that are needed for the sum to equal 351 is

- | | |
|-------|-------|
| A) 13 | B) 12 |
| C) 15 | D) 14 |

Question 13

In a geometric sequence, $t_3 = 36$ and $t_6 = 972$.

The common ratio of the sequence is

- | | |
|------|------|
| A) 2 | B) 4 |
| C) 9 | D) 3 |

Question 14

Maya earns a starting salary of \$42 000 in her first year of work.

Her salary increases by \$1 800 each year. Her total earnings, in dollars, over 12 years are _____.

Question 15

A car originally worth \$28 000 depreciates by 15% of its value each year.

The value of the car, to the nearest dollar, after 6 years is

- | | |
|-------------|-------------|
| A) \$8 976 | B) \$12 424 |
| C) \$10 560 | D) \$14 880 |

Question 16

A bacteria culture starts with 500 bacteria and triples every 4 hours.

The number of bacteria in the culture after 24 hours is

- | | |
|--------------|--------------|
| A) 364 500 | B) 121 500 |
| C) 1 093 500 | D) 1 458 000 |

Question 17

The sum of the first n terms of the geometric series $4 + 12 + 36 + \dots$ is

- | | |
|-----------------------|-----------------------|
| A) $S_n = 4(3^n - 1)$ | B) $S_n = 2(3^n + 1)$ |
| C) $S_n = 6(3^n - 1)$ | D) $S_n = 2(3^n - 1)$ |

Question 18

A geometric sequence has $t_1 = 27$ and $t_3 = 3$, where the common ratio is positive.

The sum of the infinite geometric series is _____.

Question 19

The 5th term of a geometric sequence is 96 and the 8th term is 768.

The first term of the sequence is

A) 3

B) 6

C) 12

D) 24

Question 20

The number of terms of the geometric series $2 + 6 + 18 + \dots$ that are needed for the sum to equal 242 is _____.

Question 21

A theatre has 18 rows of seats. The first row has 24 seats, and each row after the first has 3 more seats than the row in front of it.

The total number of seats in the theatre is _____.

Question 22

If $2x$, $x + 4$, and $3x - 2$ are consecutive terms of an arithmetic sequence, then the value of x is

A) 2

B) $\frac{10}{3}$

C) 4

D) 5

Question 23

The geometric mean that can be inserted between 4 and 25 is

- A) 10
B) ± 10
C) -10
D) $\frac{29}{2}$

Question 24

A sequence is defined by $t_1 = 3$ and $t_n = 2t_{n-1} + 1$ for $n \geq 2$.

The value of t_5 is _____.

Question 25

On its first swing, a pendulum travels an arc of 40 cm. Each swing after the first travels 85% of the arc of the previous swing. The total distance, to the nearest centimetre, that the pendulum travels before coming to rest is

- A) 267 cm
B) 235 cm
C) 320 cm
D) 400 cm

Answer Key

- | | | |
|--------|------------|---------|
| 1. C | 10. 84 | 19. B |
| 2. D | 11. C | 20. 5 |
| 3. A | 12. A | 21. 891 |
| 4. D | 13. D | 22. B |
| 5. 610 | 14. 622800 | 23. B |
| 6. B | 15. C | 24. 63 |
| 7. C | 16. A | 25. A |
| 8. A | 17. D | |
| 9. D | 18. 40.5 | |

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