

Series, Binomial Expansions and Limits

Grade 12 – Precalculus math · Test · Standards: A-APR.C.5, A-SSE.B.4, F-BF.A.2

Name: _____ Date: _____ Class: _____

This 45-minute test has 9 questions worth 20 points. Show the formula you use and the values you substitute. Give exact values unless the question asks for rounding.

Standards: A-APR.C.5, A-SSE.B.4, F-BF.A.2 · **Level:** Grade 12 Precalculus

Time: 45 minutes · 9 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Evaluating a Sum (2 points)

Evaluate $\sum_{k=1}^8 (5k - 3)$.

Question 2 Twenty-five Terms (2 points)

An arithmetic sequence has first term -6 and common difference 4 . Find the sum of its first 25 terms.

Question 3 A Geometric Sum (2 points)

A geometric sequence has first term 6 and common ratio -2 . Find the sum of its first 8 terms.

Question 4 Infinite Series (3 points)

Consider the series $18 - 12 + 8 - \dots$

- Find the common ratio and explain why the series has a sum. (1 point)
- Find the sum. (1 point)
- Write $0.181818\dots$ as a fraction using an infinite geometric series. (1 point)

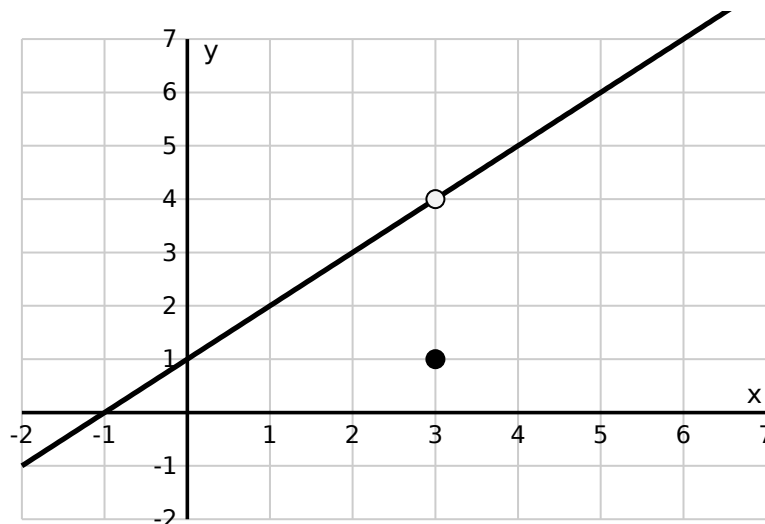
Question 5 Expanding a Binomial (2 points)

Expand $(x - 2)^4$.

Question 6 A Term of an Expansion (2 points)

Find the fourth term of the expansion of $(3x - y)^5$, in order of descending powers of x .

Question 7 Reading a Graph (3 points)



The graph of g .

The graph of a function g is shown. $g(x) = x + 1$ except at $x = 3$.

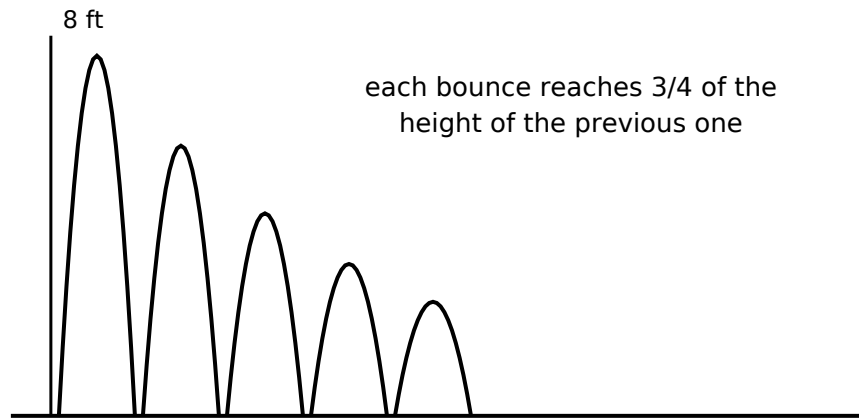
- Find $\lim_{x \rightarrow 3} g(x)$. (1 point)
- Find $g(3)$. (1 point)
- Is g continuous at $x = 3$? Explain. (1 point)

Question 8 Two Limits (2 points)

Find each limit.

- $\lim_{x \rightarrow -2} \frac{(x^2 + x - 2)}{(x + 2)}$ (1 point)
- $\lim_{n \rightarrow \infty} \frac{(4n + 7)}{(n + 1)}$ (1 point)

Question 9 Bouncing Ball (2 points)



A bouncing ball: each rebound is $\frac{3}{4}$ as high as the last.

A ball is dropped from 8 feet. Each rebound reaches $\frac{3}{4}$ of the previous height. Find the total distance the ball travels before it stops.