

23 October 2025

1.12 Classwork: Series; due Tuesday 28 October

1. Given a geometric sequence with $u_1 = 9$ and $r = \frac{4}{3}$

1. Find u_8 .

$$\begin{aligned}\text{Solution: } u_8 &= 9 \cdot \left(\frac{4}{3}\right)^{8-1} \\ &= \frac{16384}{243} = 67.42386 \dots \approx 67.4\end{aligned}$$

2. Find S_8 , the sum of the first eight terms of the sequence.

$$\begin{aligned}\text{Solution: } S_8 &= 9 \cdot \frac{\left(\frac{4}{3}\right)^8 - 1}{\frac{4}{3} - 1} \\ &= \frac{58975}{243} = 242.695 \dots \\ &\approx 243\end{aligned}$$

3. $S_k \approx 825.37$. Find k algebraically.

Solution:

$$\begin{aligned}S_k &= 9 \cdot \frac{\left(\frac{4}{3}\right)^k - 1}{\frac{4}{3} - 1} = 825.37 \\ \left(\frac{4}{3}\right)^k &= 36.5693 \dots \\ k &= \log_{\frac{4}{3}} 36.5693 \dots \\ &\approx 12\end{aligned}$$

2. Three consecutive terms of a geometric sequence are $x - 2$, 6, and $x + 7$. Find the possible values of x .

3. Find the value of each of the following, as an integer. (no calculator)

1. $\log_6 36$.

2. $\log_6 4 + \log_6 9$.

3. $\log_6 2 - \log_6 12$.

4. Solve $\log_2 x + \log_2(x - 2) = 3$, for $x > 2$.

5. Solve the equation $e^x = 4 \sin x$, for $0 \leq x \leq 2\pi$. (calculator allowed)

6. The expression $(x + a)(x + b)$ can not be written as

1. $a(x + b) + x(x + b)$

2. $x^2 + (a + b)x + ab$

3. $x^2 + abx + ab$

4. $x(x + a) + b(x + a)$

7. Graph $y = 400(.85)^{2x} - 6$ on the set of axes below.

