

Question 1. Decide whether the geometric series below converge or diverge. Justify your answer. If the series converges, compute its sum. (*3 points*)

(a) $\pi - \pi + \pi - \pi + \pi - \pi + \dots$

(b) $\sum_{n=1}^{\infty} \left(\frac{\sqrt{2}}{3}\right)^n$

Question 2. Compute the sum $S = -16 + 8 - 4 + \cdots - \frac{1}{64}$ without using a calculator. (*2 points*)

Question 3. Find the assignment rule (or law/formula) and the domain of the specified composite functions below: (3 points)

$$f \circ g \quad \text{and} \quad g \circ f, \quad \text{if} \quad f(x) = \frac{x}{x^2 - 6} \quad \text{and} \quad g(x) = \sqrt{x}.$$

Question 4. For each of the following, determine if the given equation describes y as a **function** of x . For the one(s) that you identify to be (a) function(s), determine the domain. (*2 points*)

(a) $y = \frac{1}{\sqrt{x^2 - 3x}}$

(b) $x - y^2 = 4$