MAT 108: Problem Set 8

(ADD NAME)

Due 3/7/23 at 11:59 pm on Canvas

Reminders:

- Your homework submission must be typed up in full sentences, with proper mathematical formatting. Handwritten homework submissions will receive a score of 0. Solutions containing incomplete sentences or poor formatting will lose points.

- You will receive feedback on PS6 by next Tuesday, 3/7. PS6 revisions are due Friday, 3/10 at 11:59 pm. Underneath your old solution, type

        \revisedsolution

  and then type your revised solution.

Exercise 1

Determine the sum of the series

$$\sum_{n=0}^{\infty} \frac{2^n}{3^{n+1}}.$$

Be careful. You may use the formula for the sum of a geometric series, but be careful with indices, and make sure you know what the "first term" is.

SOLUTION.

Exercise 2

Prove Proposition 12.4:

Proposition. Let $(d_k)_{k=1}^{\infty}$ be a sequence of digits. Then $\displaystyle\sum_{j=1}^{\infty} d_j \cdot 10^{-j}$ converges.

Remark. The digits in this exercise are base 10 digits, i.e. for all j, $d_j \in \{0, 1, \ldots, 9\}$.

SOLUTION.

Exercise 3

Write the following decimal expansions as fractions.

(a) $5.\overline{6} = 5.66666...$

(b) $0.346\overline{127} = 0.346127127127...$

SOLUTION.

Exercise 4

Express the following fractions as decimals.

(a) $\frac{71}{13}$

(b) $\frac{34}{31}$

SOLUTION.