Work 16: Calculus II  
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1. Evaluate the integral \[ \int \frac{\sin \theta}{1 + \sin \theta} d\theta. \]

2. Find a sequence \( \{a_n\} \) whose first five terms are \( 1, -\frac{1}{2}, -\frac{1}{6}, -\frac{1}{24}, -\frac{1}{120}, \ldots \)
   Then determine whether the sequence converges or diverges.

3. Find a sequence \( \{a_n\} \) whose first five terms are \( 2, \frac{3}{3}, \frac{4}{5}, \frac{5}{6}, \frac{6}{9}, \ldots \)
   Then determine whether the sequence converges or diverges.

4. Determine whether the sequence \( \{a_n\} = \left\{ 3 - \frac{1}{2^n} \right\} \) converges or diverges. If the sequence converges, then find its limit.

5. Determine whether the sequence \( \{a_n\} = \left\{ (-1)^n \frac{n}{n + 1} \right\} \) converges or diverges. If the sequence converges, then find its limit.

6. Determine whether the sequence \( \{a_n\} = \left\{ \left( -\frac{2}{3} \right)^n \right\} \) converges or diverges. If the sequence converges, then find its limit.

7. Determine whether the sequence is monotonic and find the possible bound of the sequence. \( \{a_n\} = \left\{ \frac{n}{2^{n+3}} \right\} \)

8. Consider the sequence \( \sqrt{2}, \sqrt{2 + \sqrt{2}}, \sqrt{2 + \sqrt{2 + \sqrt{2}}}, \ldots \), where \( a_n = \sqrt{2 + a_{n-1}}, n \geq 2 \)
   Compute the first five terms of the sequence. And Find its limit.