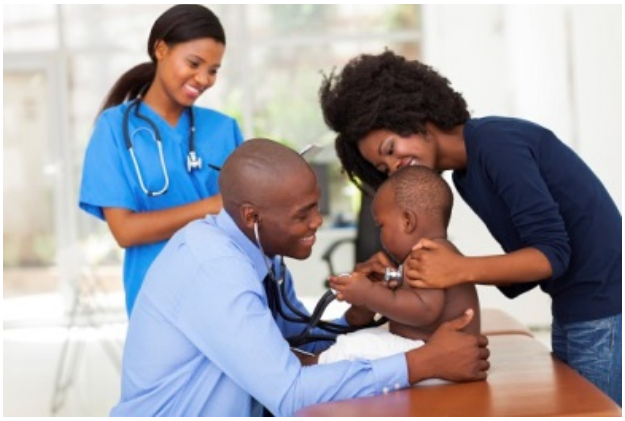
9.3 Finding Limits of Series and Limits of Infinity

Practice Tasks



I. Concepts and Procedures

1. Use a graph or a table to determine whether the sequence with the given n^{th} term converges or diverges. If a sequence converges, find $\lim_{n\to\infty} a_n$.

   a. $a_n = \frac{3n-4}{n}$

   b. $a_n = 2n - 6$

   c. $a_n = \frac{1}{2^n}$

2. For each arithmetic or geometric sequence below, write an explict formula for a_n and tell whether the sequence converges or diverges. If the sequence converges, give $\lim_{n\to\infty} a_n$.

   a. -8, -5, -2, 1, 4, …

   b. 1, -2, 4, -8, 16, …

   c. $3, 1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \ldots$

3. Determine $\lim_{n\to\infty} f(x)$ for each of the following functions, if it exists.

a. $f(x) = 3x - 8$

b. $f(x) = \frac{1}{x^2}$

c. $f(x) = \frac{3x^2+2x-3}{2x^2+4}$

d. $f(x) = 6$

e. $f(x) = \frac{2x^2+1}{x}$

II. Reasoning

1. Dean wonders if there is a limit to how much toothpaste you can get out of the tube or if there is always enough to brush your teeth just one more time. How does this illustrate the idea of the limit of a sequence as *n* approaches ∞ ?