Mathematics Quote: \textit{For a physicist mathematics is not just a tool by means of which phenomena can be calculated, it is the main source of concepts and principles by means of which new theories can be created.}

– Freeman Dyson, Mathematics in the Physical Sciences.

1. Reading assignment for Section 1.4:
   (1) Definition 4.1-4.2.
   (2) Definition for a removable discontinuous point on Page 99 (right above Example 4.3).
   (3) Theorem 4.1-4.3.
   (4) Examples from the lecture notes.
   (5) Examples 4.4 and 4.6.

2. State the definition of a removable discontinuous point \( x = a \) of \( f(x) \).

3. The graph of \( f(x) \) is given below.

4. Consider the function \( f(x) \) whose graph is given in Problem 6 on Page 107. We know that \( f(x) \) is not continuous at
   
   (i) \( x = -2 \)   (ii) \( x = -1 \)   (iii) \( x = 1 \) and
   (iv) \( x = 2 \).

   Determine which of these points are removable.

5. Determine the intervals on which \( f(x) \) is continuous.
   
   (i) \( f(x) = \frac{x^2 + 1}{x^2 - 2} \)   (ii) \( f(x) = \sqrt{x^2 - 4} \)   (iii) \( f(x) = \ln(3 + 2x) \)
   
   Extra points: (iv) \( f(x) = \frac{x}{\sqrt{4 - x^2}} \)   (v) \( f(x) = \ln(4 - x^2) \)