General Question. Are the results reasonable, based on the graph?

1. Find all values where the function R is not continuous by using the *discont* command. Classify each discontinuity as infinite, jump, or removable. Justify your answers.

$$R(t) = \frac{t^2 - 4t - 5}{t^3 + 2t^2 - 11t - 12}$$

2. Determine all values where the function f is not differentiable. Give the exact values and justify each answer.
   [*Hint.* To graph the complete function, the function needs to be written in a different form.]

$$f(x) = (x - 3)^{\frac{2}{3}} + \frac{4\sin(x)}{x^2 + 3x - 5}$$

3. Define the following two functions.

$$g(x) = |x + 2| \cdot \sqrt[3]{x^2 + 3x - 5} \text{ and } h(x) = |x + 2| \cdot \text{surd}(x^2 + 3x - 5, 3)$$

   Look at and comment on the output Maple gives.

   (a) Graph g and h (on separate coordinate planes). Then, find a value in the region where the graphs differ and evaluate (and approximate) both g and h at that value.

   (b) Use the *iscont* command to test both g and h for continuity on the interval $(-\infty, \infty)$. Then use the *discont* command to find any discontinuities of both g and h. Comment on the results.

   (c) Find where the derivative of h is discontinuous and classify the discontinuities of the derivative.

4. (a) Show that S has a removable discontinuity at $x = 0$, where S is defined by

$$S(x) = \frac{3^x - 1}{x}.$$

   Remember to state your conclusion in a sentence.

   (b) Based on the results of part (a), a continuous function T can be defined where $T(x) = S(x)$ for x not equal to 0, but T is defined and continuous at 0. Define the function T.

   (c) Test both T and its derivative for continuity at $x = 0$ by using the *iscont* command.

   (d) Find the derivative of T at $x = 0$.