

# Math 1a. §2.5. Limits Involving Infinity Worksheet

Fall 2005

1. Graph

$$y = \frac{2x^3 - 16}{x^3 - 27},$$

after calculating the limits as  $x \rightarrow 3$  and  $x \rightarrow \pm\infty$ . What are the vertical and horizontal asymptotes.

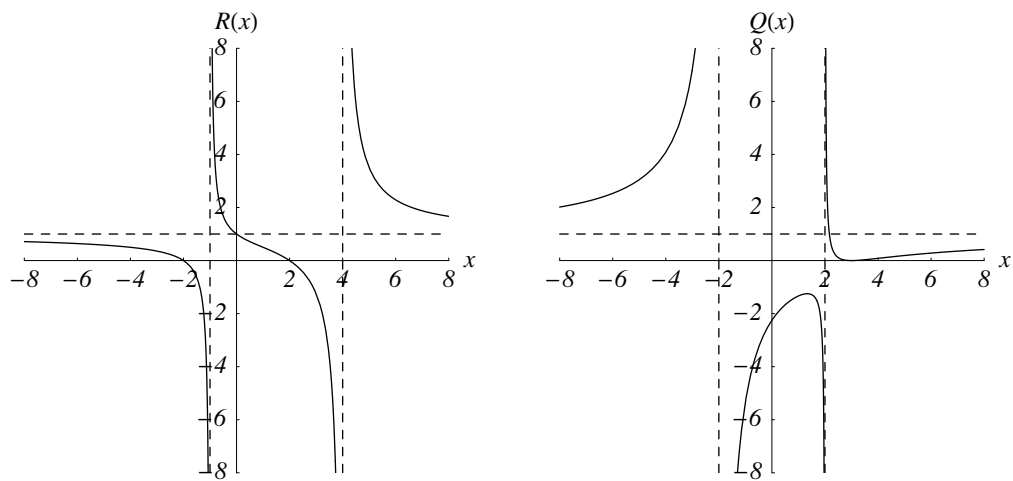
2. Let  $t$  be the time in weeks. At time  $t = 0$ , organic waste is dumped into a pond. The oxygen level in the pond at time  $t$  is given by

$$f(t) = \frac{t^2 - t + 1}{t^2 + 1}.$$

Assume that  $f(0) = 1$  is the normal level of oxygen.

- (a) Sketch the graph of this function.
- (b) Describe the shape of the graph. What is the significance of the minimum for the pond?
- (c) What eventually happens to the oxygen level of the pond?  
Approximately how many weeks must pass before the oxygen level returns to 75% of its normal level?

3. Find possible equations to match the following graphs.



4. Explain what happens to the rational function

$$h(x) = \frac{x^2 + 1}{x}$$

as  $x \rightarrow \pm\infty$ .