Lesson 1 Practice Problems

Introduction to Limits & Their Properties MATH 2200-98

Determining Limits from a Graph

1. Below is the graph of $f(x)$. For each of the given points determine the value of $f(a)$ and $\lim_{x\to a} f(x)$. If any of the quantities do not exist clearly explain why.

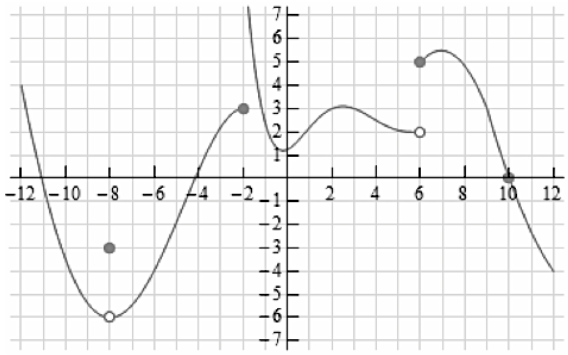

Figure 1: Graph of $f(x)$

(a) $a = -2$ (b) $a = 6$ (c) $a = 10$ (d) $a = -8$

Evaluating Limits with Limit Laws & Properties

2. $\lim_{t\to -2} \dfrac{t^4 - 2}{2t^2 - 3t + 2}$

3. $\lim_{h\to 0} \dfrac{\sqrt{9+h} - 3}{h}$

4. $\lim_{x\to -1} \dfrac{2x^2 + 3x + 1}{x^2 - 2x - 3}$

Evaluating Limits Involving Absolute Value

5. Let $g(x) = \dfrac{x^2 + x - 6}{|x - 2|}$

(a) Find $\lim_{x\to 2^+} g(x)$ and $\lim_{x\to 2^-} g(x)$

(b) Does $\lim_{x\to 2} g(x)$ exist? Explain why or why not.

Applying the Squeeze Theorem

6. Consider the graphs of $f(x) = x^2$, $h(x) = -x^2$, $g(x) = x^2 \sin\left(\dfrac{1}{x}\right)$ given below in Figure 2.

Use this information to evaluate

$$\lim_{x\to 0} x^2 \sin\left(\frac{1}{x}\right)$$

by applying the Squeeze Theorem.

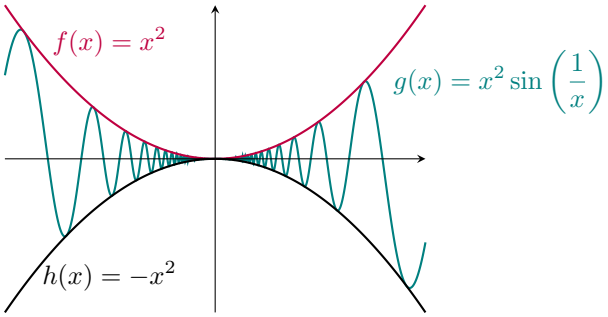

Figure 2: Graphs of $f(x)$, $g(x)$, $h(x)$