1. Suppose we know that $\lim_{x \to -2} f(x) = -3$ and $\lim_{x \to -2} g(x) = 7$. Find the value of

$$\lim_{x \to -2} \frac{5f(x)\sqrt{g(x) + 3}}{11f(x) - g(x)}$$

and justify each step by naming an appropriate Limit Law. (Use names and not numbers — no one knows the numbers.)

2. Evaluate the limit, if it exists.

(a) $\lim_{x \to -3} \dfrac{(x + 1)^3 + 8}{x + 3}$

(b) $\lim_{h \to 0} \dfrac{\dfrac{1}{2 + h} - \dfrac{1}{2}}{h}$

(c) $\lim_{x \to 1} \dfrac{x^2 - 4x + 3}{x^2 + x - 2}$

(d) $\lim_{h \to 0} \dfrac{\sqrt{5 + h} - \sqrt{5}}{h}$

3. Consider the functions

$$f(x) = -\,|x - 1| \qquad g(x) = (x - 1)\sin\left(\frac{1}{x - 1}\right) \qquad h(x) = |x - 1|$$

(a) Draw the graphs of f, g, and h for x near 1.

(b) Explain how you can use the Squeeze Theorem to figure out $\lim_{x \to 1} g(x)$.