

**Homework 14.2: Finding Limits Algebraically**  
**For credit, please show all work on separate paper.**

1. Suppose that

$$\lim_{x \rightarrow a} f(x) = -3$$

$$\lim_{x \rightarrow a} g(x) = 0$$

$$\lim_{x \rightarrow a} h(x) = 8$$

Find the value of the given limit, if it exists.

a)  $\lim_{x \rightarrow a} [f(x) + h(x)]$

b)  $\lim_{x \rightarrow a} [f(x)]^3$

c)  $\lim_{x \rightarrow a} \sqrt[3]{h(x)}$

d)  $\lim_{x \rightarrow a} \frac{1}{f(x)}$

e)  $\lim_{x \rightarrow a} \frac{f(x)}{h(x)}$

f)  $\lim_{x \rightarrow a} \frac{g(x)}{f(x)}$

g)  $\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$

h)  $\lim_{x \rightarrow a} \frac{2f(x)}{h(x) - f(x)}$

2. The graphs of  $f$  and  $g$  are given. Use them to evaluate each limit, if it exists.

(a)  $\lim_{x \rightarrow 2} [f(x) + g(x)]$

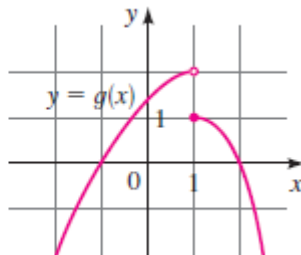
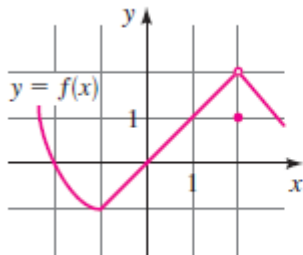
(b)  $\lim_{x \rightarrow 1} [f(x) + g(x)]$

(c)  $\lim_{x \rightarrow 0} [f(x)g(x)]$

(d)  $\lim_{x \rightarrow -1} \frac{f(x)}{g(x)}$

(e)  $\lim_{x \rightarrow 2} x^3 f(x)$

(f)  $\lim_{x \rightarrow 1} \sqrt{3 + f(x)}$



**#3-14 Evaluate the limit, if it exists.**

3.  $\lim_{x \rightarrow 4} (5x^2 - 2x + 3)$

8.  $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x^2 - 1}$

12.  $\lim_{x \rightarrow -4} \frac{\frac{1}{x} + \frac{1}{4}}{4 + x}$

4.  $\lim_{x \rightarrow -1} \frac{x - 2}{x^2 + 4x - 3}$

9.  $\lim_{h \rightarrow 0} \frac{(2+h)^3 - 8}{h}$

13.  $\lim_{x \rightarrow -1} \frac{x^2 - x - 2}{x^3 - x}$

5.  $\lim_{x \rightarrow 1} \left( \frac{x^4 + x^2 - 6}{x^4 + 2x + 3} \right)^2$

10.  $\lim_{x \rightarrow 2} \frac{x^4 - 16}{x - 2}$

14.  $\lim_{x \rightarrow 1} \frac{x^8 - 1}{x^5 - x}$

6.  $\lim_{u \rightarrow -2} \sqrt{u^4 + 3u + 6}$

11.  $\lim_{h \rightarrow 0} \frac{(3+h)^{-1} - 3^{-1}}{h}$

7.  $\lim_{x \rightarrow 2} \frac{x^2 + x - 6}{x - 2}$