

**Directions:** Calculator problems are designated with  $\text{☒}$  symbol.

1. Figure 5.2 shows the graph of  $g(x)$ . Find:  $\lim_{x \rightarrow 3} g(x)$

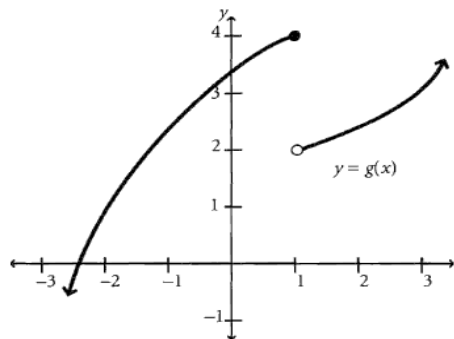


Figure 5.2

2. Figure 5.2 shows the graph of  $g(x)$ . Find:  $g(1)$

$\text{☒}$  3. Graph  $f(x) = \sin \frac{\pi}{x}$ . Use the graph to help you find  $\lim_{x \rightarrow 0} \sin \frac{\pi}{x}$ .

$\text{☒}$  4. Use the graph from #3 to help you find  $\lim_{x \rightarrow \infty} \sin \frac{\pi}{x}$ .

$\text{☒}$  5. Find:  $\lim_{x \rightarrow 0} \sin \frac{x}{x-1}$

$\text{☒}$  6. Find:  $\lim_{x \rightarrow \infty} \sin \frac{x}{x-1}$

$\text{☒}$  7. Find:  $\lim_{x \rightarrow 0} \sin(\sqrt{x} - 2)$

8. Find:  $\lim_{x \rightarrow 0} \frac{x^2 + x - 12}{x + 4}$

9. Find:  $\lim_{x \rightarrow -4} \frac{x^2 + x - 12}{x + 4}$

10. Find  $\lim_{x \rightarrow 5} f(x)$ , where  $f(x) = \begin{cases} x + 2, & x < 5 \\ 2 - 2x, & x \geq 5 \end{cases}$ .

11. If  $\lim_{x \rightarrow 2} f(x) = -4$  and  $\lim_{x \rightarrow 2} g(x) = 9$ , find  $\lim_{x \rightarrow 2} \frac{\sqrt{g(x)}}{(f(x))^2}$ .

12. Find:  $\lim_{x \rightarrow -5^+} \frac{2|x+5|}{x+5}$

13. Find:  $\lim_{x \rightarrow 0} \frac{\sin 3x}{x}$

14. Find:  $\lim_{x \rightarrow 0} \frac{e^x - 3}{x}$

15. Find:  $\lim_{x \rightarrow 4} \frac{\frac{1}{x} - \frac{1}{4}}{x - 4}$

16. Find:  $\lim_{x \rightarrow \infty} \frac{7x^2}{2x^2 + 7}$

17. Find:  $\lim_{x \rightarrow \infty} \frac{x+3}{x^2-9}$

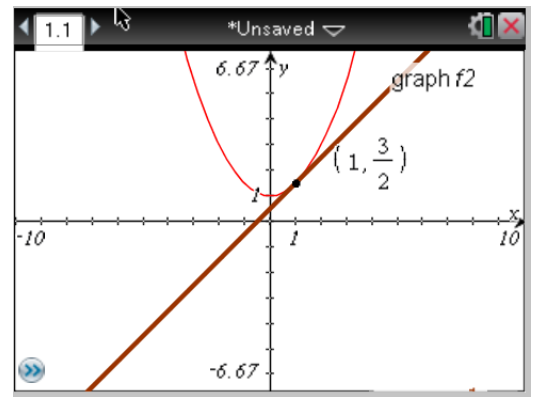
18. If  $f(x) = 1 - \frac{4}{x}$ , then  $f(x+h) = ?$

19. If  $f(x) = 3x^2 - 2x + 1$ , then  $\frac{f(x+h)-f(x)}{h} = ?$

20. Find:  $\lim_{h \rightarrow 0} \frac{4x^2h + 2xh^2 + h^3}{h}$

21. Find:  $\lim_{h \rightarrow 0} \frac{\sqrt{2x+h} - \sqrt{2x}}{h}$

22. Using the graph on the right, approximate the slope of the curve at  $x = 1$ .



23. Let  $f(h) = \frac{h^2-144}{h+12}$ . Find  $\lim_{h \rightarrow -12} \frac{h^2-144}{h+12}$  numerically. Fill in the given table.

$h$	-12.1	-12.01	-12.001	-12	-11.999	-11.99	-11.9
$f(h)$							

24. If  $f(x) = 2 - 3x^2$ , find the derivative of  $f$ .