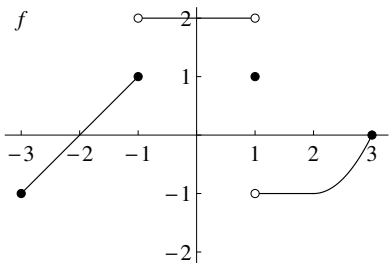
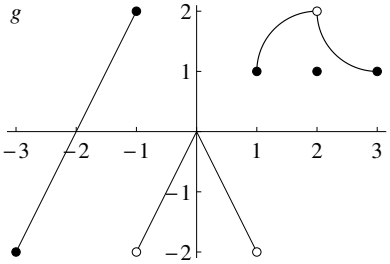
Working with Limits

1. The graph of functions f and g are given below. Evaluate the following quantities.





(a) $\lim_{x \to 2} g(x)$

(b) $g(2)$

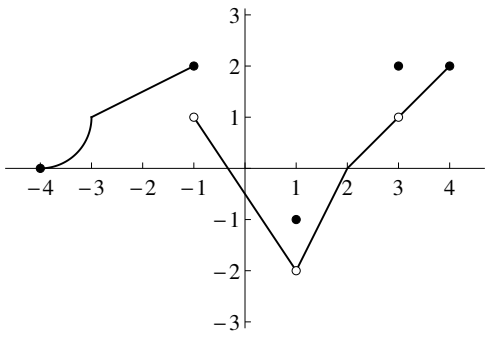
(c) $\lim_{x \to 2} \dfrac{f(x)}{g(x)}$

(d) $\lim_{x \to 1} \dfrac{f(x)}{g(x)}$

(e) $\lim_{x \to -1} \dfrac{f(x)}{g(x)}$

(f) $\lim_{x \to -2} \dfrac{f(x)}{g(x)}$

2. The graph of a function $g(x)$ is given below. Evaluate the following limits. If a limit does not exist because the one-sided limits differ, evaluate both one-sided limits.



(a) $\lim_{h\to 0} \dfrac{g(-2+h)-g(-2)}{h}$

(b) $\lim_{x\to 0} \dfrac{g(x)-g(0)}{x}$

(c) $\lim_{x\to 2} \dfrac{g(x)-g(2)}{x-2}$

(d) $\lim_{x\to 3} \dfrac{g(x)-g(3)}{x-3}$

3. Sketch the graph of the relevant function, and use it to find the specified limit.

(a) $\lim_{x\to 2^+} \left(3-\dfrac{4}{x-2}\right)$

(b) $\lim_{x\to 2^-} \left(3-\dfrac{4}{x-2}\right)$

(c) $\lim_{x\to \infty} \left(3-\dfrac{4}{x-2}\right)$

Working with Limits – Solutions

1. (a) 2

   (b) 1

   (c) $-\frac{1}{2}$

   (d) -1

   (e) Does not exist.

   (f) $\frac{1}{2}$

2. (a) $\frac{1}{2}$

   (b) $-\frac{3}{2}$

   (c) Does not exist.

   (d) Does not exist.

3. (a) Does not exist $(-\infty)$

   (b) Does not exist (∞)

   (c) 3