5. **(a)** $f(x)$ approaches 2 as x approaches 1 from the left, so $\lim_{x\to 1^-} f(x)=2$.

(b) $f(x)$ approaches 3 as x approaches 1 from the right, so $\lim_{x\to 1^+} f(x)=3$.

(c) $\lim_{x\to 1} f(x)$ does not exist because the limits in part (a) and part (b) are not equal.

(d) $f(x)$ approaches 4 as x approaches 5 from the left and from the right, so $\lim_{x\to 5} f(x)=4$.

(e) $f(5)$ is not defined, so it doesn't exist.

7. **(a)** $\lim_{t\to 0^-} g(t)=-1$

(b) $\lim_{t\to 0^+} g(t)=-2$

(c) $\lim_{t\to 0} g(t)$ does not exist because the limits in part (a) and part (b) are not equal.

(d) $\lim_{t\to 2^-} g(t)=2$

(e) $\lim_{t\to 2^+} g(t)=0$

(f) $\lim_{t\to 2} g(t)$ does not exist because the limits in part (d) and part (e) are not equal.

(g) $g(2)=1$

(h) $\lim_{t\to 4} g(t)=3$

9. **(a)** $\lim_{x\to -7} f(x)=-\infty$

(b) $\lim_{x\to -3} f(x)=\infty$

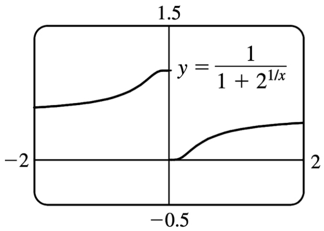
(c) $\lim_{x\to 0} f(x)=\infty$

(d) $\lim_{x\to 6^-} f(x)=-\infty$

(e) $\lim_{x\to 6^+} f(x)=\infty$

(f) The equations of the vertical asymptotes are $x=-7$, $x=-3$, $x=0$, and $x=6$.

11.

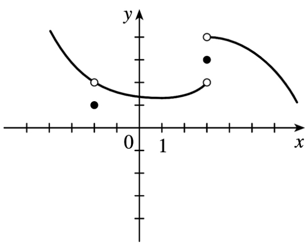


(a) $\lim_{x \to 0^-} f(x) = 1$

(b) $\lim_{x \to 0^+} f(x) = 0$

(c) $\lim_{x \to 0} f(x)$ does not exist because the limits in part (a) and part (b) are not equal.

13. $\lim_{x \to 3^+} f(x) = 4$, $\lim_{x \to 3^-} f(x) = 2$,
$\lim_{x \to -2} f(x) = 2$, $f(3) = 3$, $f(-2) = 1$



17. For $f(x) = \dfrac{\sin x}{x + \tan x}$:

x	$f(x)$
± 1	0.329033
± 0.5	0.458209
± 0.2	0.493331
± 0.1	0.498333
± 0.05	0.499583
± 0.01	0.499983

It appears that $\lim_{x \to 0} \dfrac{\sin x}{x + \tan x} = 0.5 = \dfrac{1}{2}$.

19. For $f(x)=\dfrac{\sqrt{x+4}-2}{x}$:

x	$f(x)$
1	0.236068
0.5	0.242641
0.1	0.248457
0.05	0.249224
0.01	0.249844

x	$f(x)$
–1	0.267949
–0.5	0.258343
–0.1	0.251582
–0.05	0.250786
–0.01	0.250156

It appears that $\lim\limits_{x\to 0}\dfrac{\sqrt{x+4}-2}{x}=0.25=\dfrac{1}{4}$.