

# 1.4 Continuity and One-Sided Limits

Pgs. 79-81 #1's 1-13 odd, 22, 27, 28, 103, 108

1) a)  $\lim_{x \rightarrow c^+} f(x) = 3$

b)  $\lim_{x \rightarrow c^-} f(x) = 3$

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

The function is everywhere continuous.

7)  $\lim_{x \rightarrow 8^+} \frac{1}{x+8} = \frac{1}{16}$

3) a) 0

b) 0

c) 0

The function has a removable discontinuity at  $x=3$

5) a) -3

b) 3

c) DNE

The function has a nonremovable discontinuity at  $x=2$ .

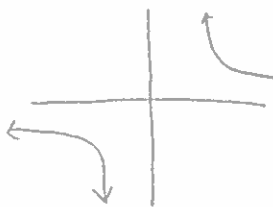
9)  $\lim_{x \rightarrow 5^+} \frac{x-5}{x^2-25}$

$\lim_{x \rightarrow 5^+} \frac{x-5}{(x-5)(x+5)} = \frac{1}{x+5} = \frac{1}{10}$

11)  $\lim_{x \rightarrow -3^-} \frac{x}{\sqrt{x^2-9}} = -\infty$

DNE

The function decreases without bound.



13)  $\lim_{x \rightarrow 0^-} \frac{|x|}{x} = -1$

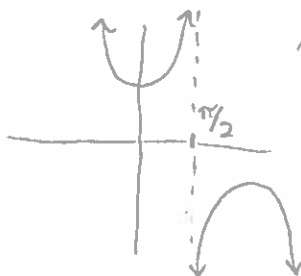


22)  $\lim_{x \rightarrow \pi/2} \sec x$

$\lim_{x \rightarrow \pi/2} \frac{1}{\cos x} = \frac{1}{\cos \pi/2} = \frac{1}{0}$

DNE

The left and right limits do not match.



27) This graph is continuous at all points except  $x = -2$  and  $x = 2$  where the graph has asymptotes.

28) This graph is continuous at all points except  $x = -1$  where there is a hole in the graph.

103) True

$$108) \lim_{t \rightarrow 4^-} f(t) = 28$$

$$\lim_{t \rightarrow 4^+} f(t) = 56$$

$\lim_{t \rightarrow 4^-} f(t)$  is the amount of undissolved chlorine remaining in the pool at the end of day 3 and right before more is added.

$\lim_{t \rightarrow 4^+} f(t)$  is the amount of undissolved chlorine right after more was added to the pool.