

1.3

$$77. \lim_{t \rightarrow 0} \frac{\sin 3t}{2t} = \lim_{t \rightarrow 0} \frac{\sin 3t}{3t} \cdot \frac{3}{2}$$

$$= \underbrace{\lim_{t \rightarrow 0} \frac{\sin 3t}{3t}}_{=1} \cdot \underbrace{\lim_{t \rightarrow 0} \frac{3}{2}}_{=\frac{3}{2}}$$

$$= \frac{3}{2}$$

$$73. \lim_{h \rightarrow 0} \frac{(1 - \cosh h)^2}{h}$$

$$= \underbrace{\lim_{h \rightarrow 0} \frac{1 - \cosh h}{h}}_{=0} \cdot \underbrace{\lim_{h \rightarrow 0} (1 - \cosh h)}_0$$

$$= 0$$

$$75. \lim_{x \rightarrow \frac{\pi}{2}} \frac{\cos x}{\cot x}$$

$$= \lim_{x \rightarrow \frac{\pi}{2}} \frac{\cos x}{\frac{\cos x}{\sin x}} = \lim_{x \rightarrow \frac{\pi}{2}} \frac{\cancel{\cos x}}{1} \cdot \frac{\sin x}{\cancel{\cos x}}$$

$$= \lim_{x \rightarrow \frac{\pi}{2}} \sin x = \sin \frac{\pi}{2} = 1$$

$$88. \lim_{x \rightarrow a} f(x)$$

$$b - |x - a| \leq f(x) \leq b + |x - a|$$

$$\lim_{x \rightarrow a} b - |x - a| \leq \lim_{x \rightarrow a} f(x) \leq \lim_{x \rightarrow a} b + |x - a|$$

$$b \leq \lim_{x \rightarrow a} f(x) \leq b$$

lim b

1.4

Discuss the [dis]continuity of the function.

$$f(x) = \frac{(x+4)(x-2)}{(x-2)(x+1)} = \frac{x+4}{x+1}, x \neq 2$$

removable discontinuity @ 2

non-removable discontinuity @ -1

f is continuous on:

$$(-\infty, -1) \cup (-1, 2) \cup (2, \infty)$$

$$f(x) = \frac{|x-2|}{x-2}$$

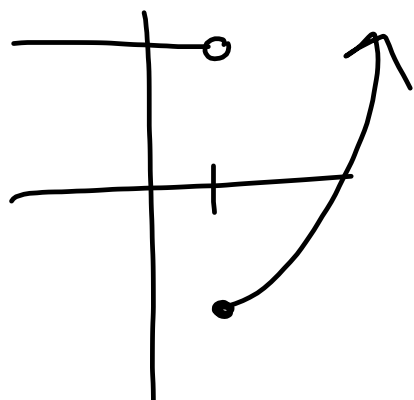
non-removable (jump)

discontinuity @ $x=2$

f is continuous on

$$(-\infty, 2) \cup (2, \infty)$$

$$f(x) = \begin{cases} x^2 - 2, & x \geq 1 \\ 5, & x < 1 \end{cases}$$

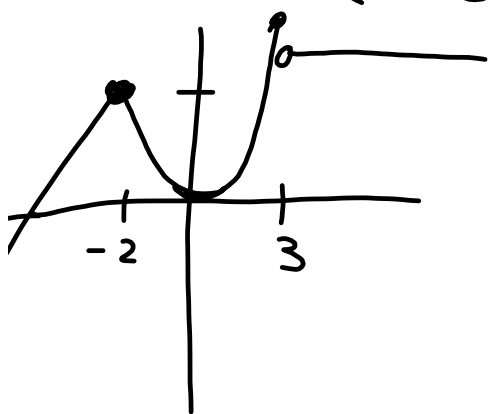


non-removable
discontinuity @ 1

f is continuous on

$$(-\infty, 1) \cup [1, \infty)$$

$$f(x) = \begin{cases} x + 6, & x \leq -2 \\ x^2, & -2 < x \leq 3 \\ 8, & x > 3 \end{cases}$$



non-removable
discontinuity @ 3

f is continuous on

$$(-\infty, 3] \cup (3, \infty)$$

$$f(x) = \begin{cases} \frac{|x-3|}{3-x}, & |x-3| > 5 \\ & x-3 > 5 \text{ or } x-3 < -5 \\ & x > 8 \text{ or } x < -2 \\ x^2 - 3, & -2 \leq x \leq 8 \end{cases}$$

$$\frac{|x-3|}{3-x} = \begin{cases} -1, & x > 3 \\ 1, & x < 3 \end{cases}$$

$$f(x) = \begin{cases} 1, & x < -2 \\ x^2 - 3, & -2 \leq x \leq 8 \\ -1, & x > 8 \end{cases}$$

discuss the (dis)continuity.

@ 8 - non-removable

f is continuous on:

$$(-\infty, 8] \cup (8, \infty)$$

$$\lim_{x \rightarrow -2^-} f(x) = 1$$

$$\lim_{x \rightarrow 3^+} f(x) = 6$$

$$\lim_{x \rightarrow 8^-} f(x) = 6$$

$$\lim_{x \rightarrow -2^+} f(x) = 1$$

$$\lim_{x \rightarrow 3^-} f(x) = 6$$

$$\lim_{x \rightarrow 8^+} f(x) = -1$$

1.4

7-17 odd

25-28 all

39-47 odd

Bonus: # 57, 59