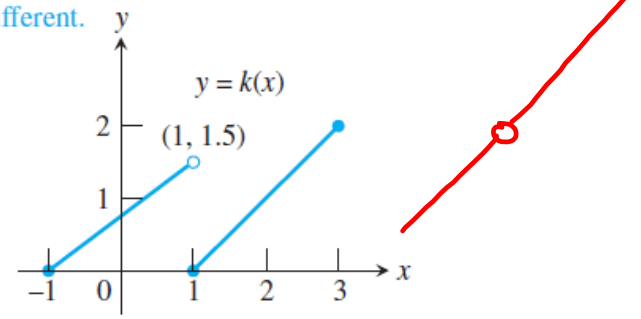
26. Determine

(a) $\lim_{x \to 1^-} k(x)$. 1.5 (b) $\lim_{x \to 1^+} k(x)$. 0 (c) $k(1)$. 0

(d) whether $k(x)$ is continuous at $x = 1$. No

(e) the points of discontinuity of $k(x)$. k is discontinuous at $x = 1$ (and points not in domain).

(f) **Writing to Learn** whether any points of discontinuity are removable. If so, describe the new function. If not, explain why not. Discontinuity at $x = 1$ is not removable because the two one-sided limits are different.



43. $f(x) = 1 + \sin x$

average rate of change over $[0, \pi/2]$

$a \quad b$

formula: avg. ROC $= \dfrac{f(b) - f(a)}{b - a}$

$= \dfrac{f(\frac{\pi}{2}) - f(0)}{\frac{\pi}{2} - 0}$

$= \dfrac{1 + 1 - 1}{\pi/2} = \dfrac{2}{\pi}$

limits as $x \to \pm\infty$

think about what happens

when $x = 10^9$

or $x = -10^9$

#6 $\lim_{x\to\pm\infty} \frac{2x^2+3}{5x^2+7} = \frac{2}{5}$

#7 $\lim_{x\to\pm\infty} \frac{x^4+x^3}{12x^3+128}$

let $x = 10^9$ $\sim \frac{x^4}{12x^3} = \frac{x}{12}$

$\to +\infty$

$\lim_{x\to\infty} \frac{x^4+x^3}{12x^3+128} = \infty$

let $x = -10^9$ $\lim(=) = -\infty$

$\frac{x}{12} \to -\infty$ $x \to -\infty$

#13 $\lim_{x\to\infty} (e^{-x}\cos x)$

$= \lim_{x\to\infty} \frac{\cos x}{e^x} = 0$