Chapter 1 Saturday Review

Demo

(1) $\lim_{x \to \infty} \dfrac{-4 + x^3 - x^5}{2 + x + 2x^6}$

(2) $\lim_{x \to 3^-} \dfrac{-x + 2}{(x-3)(x+2)}$

(3) $\lim_{x \to 3} \dfrac{-x + 2}{(x-3)(x+2)}$

(4) $\lim_{x \to 4} \dfrac{2 - \sqrt{x}}{4 - x}$

(5) $\lim_{x \to 0} \dfrac{\sin(2x) + x\cos(4x)}{3x}$

(6) $\lim_{x \to \frac{\pi}{2}} \dfrac{\sin 5x}{x}$

(7) $\lim_{x \to -\infty} \dfrac{2x - 3}{\sqrt{2x^2 - 3}}$

(8) $\lim_{x \to 3^-} f(x)$ $\qquad f(x) = \begin{cases} -x^2 + 2x - 5 & \text{if } x \leq 3 \\ -3x + 2 & \text{if } x > 3 \end{cases}$

$\lim_{x \to 3} f(x)$

(9) $\lim_{x \to 3} \dfrac{x^3 - 3x^2 + 5x - 15}{x - 3}$

(10) $\lim_{x \to 2^+} \dfrac{|x-2|}{x^2+3x-10}$

(11) Rewrite removing any discontinuity (if possible)

$$f(x) = \frac{x^2+7x+12}{x+3}$$

(12) $$f(x) = \begin{cases} -x^3+2x+4 & \text{if } x \leq -2 \\ -5x-2 & \text{if } x > -2 \end{cases}$$

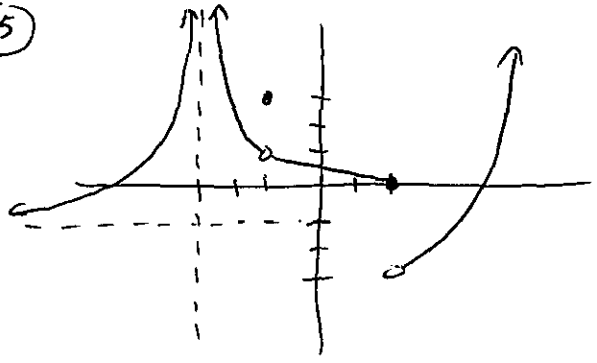
Is $f(x)$ continuous at $x = -2$? Justify your answer

(13) $$f(x) = \frac{5-x}{\tan x - \sqrt{3}}$$ where not continuous on $[0, 2\pi)$

(14) Find k to make $f(x)$ continuous

$$f(x) = \begin{cases} -3k^2+5xk-4 & \text{if } x \leq 1 \\ 3k-x & \text{if } x > 1 \end{cases}$$

(15)



Find each Limit

$\lim$ $x \to -\infty$

$x \to -3$

$x \to -1$

$x \to 2^-$

$x \to 2$

$x \to \infty$

(16) Sketch a graph with the following properties

$\lim_{x \to -\infty} = -\infty$

$x \to -1^- = 5$

$x \to -1^+ = 1$

$x \to 3 = 4$

$f(3) = -2$

$x \to 5^- = \infty$

$x \to 5 = DNE$

$x \to \infty = 3$

(17) $$f(x) = \begin{cases} \dfrac{x^2 - 4x}{x} & \text{if } x \neq 0 \\ -4 & \text{if } x = 0 \end{cases}$$

True or false: a) $f(x)$ is continuous at $x = 0$

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

(18) $$f(x) = \frac{2x - 3}{2x^2 - x - 3}$$

True or false: a) $f(x)$ has a horizontal asymptote at $y = 1$

b) $f(x)$ has a vertical asymptote at $x = -1$

c) $\lim_{x \to \frac{3}{2}} f(x)$ exists

(19) $f(x) = x^2 - 4x + 7$

Does $f(x) = 5$ on $[2, 6]$ Justify your answer.

Chapter 1 Saturday Review Practice

(1) $\lim_{x \to 2} \dfrac{5 - x + x^3}{8 - x^2}$

(2) $\lim_{x \to 3} \dfrac{2 - \sqrt{x+1}}{x - 3}$

(3) $\lim_{x \to 5} \dfrac{|x-5|}{x^2 - 6x + 5}$

(4) $\lim_{x \to 0} 2\cos x + \dfrac{\sin(3x)}{5x}$

(5) $\lim_{x \to 2^-} f(x)$ $\quad f(x) = \begin{cases} x^2 - 5x + 1 & \text{if } x \leq 2 \\ x^2 + 4 & \text{if } x > 2 \end{cases}$

(6) $\lim_{x \to 2} \dfrac{x^2 - 2x}{x - 2}$

(7) $\lim_{x \to 4^-} \dfrac{x - 1}{x + 4}$

(8) Rewrite $f(x)$ removing any discontinuity

$f(x) = \dfrac{x^2 - 3x - 4}{x - 1}$

(9) Sketch a graph with the following properties

$\lim x \to -\infty = 5$ $\qquad x \to \infty = \infty$

$x \to -1^- = -\infty$

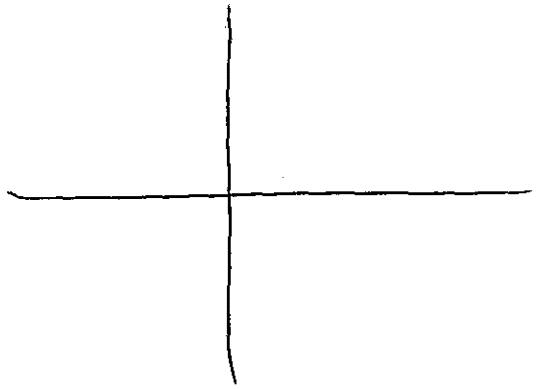
$x \to -1^+ = \infty$

$x \to 2^- = 3$

$x \to 2 = DNE$

$x \to 5 = -1$

Not continuous at $x = 5$



(10) $f(x) = \dfrac{5x - 10}{x^2 - 4}$

True or False

a) $f(x)$ is not continuous at $x = 2$

b) $f(x)$ has a vertical asymptote at $x = 2$

c) $f(x)$ has a horizontal asymptote at $y = 5$

d) $\lim_{x \to 2} f(x)$ exists

e) $\lim_{x \to -2^+} f(x) = \infty$

(11)

x	$f(x)$
-3	5
-1	1
0	-3
1	8
4	2

$f(x)$ is continuous for all values x on $[-3, 4]$

a) Show that $f(x)$ has at least 2 zeroes on $[-3, 4]$. Justify your answer

b) How many times (at least) must $f(x) = 3$ on $[-3, 4]$