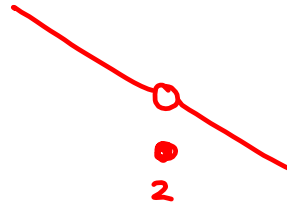


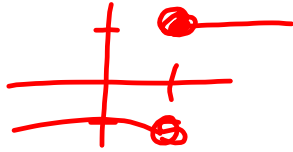
1. $\lim_{x \rightarrow 2} f(x)$, where $f(x) = \begin{cases} 4-x, & x \neq 2 \\ 0, & x = 2 \end{cases}$

2



2. $\lim_{x \rightarrow 5} \frac{|x-5|}{x-5}$

does not exist



6. $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x}$

0

3. $\lim_{x \rightarrow -1} \frac{x^2 - 1}{x + 1}$

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

-2

7. $\lim_{x \rightarrow 4} \frac{\sqrt{x+5} - 3}{x - 4} \cdot \frac{\sqrt{x+5} + 3}{\sqrt{x+5} + 3}$

4. $\lim_{x \rightarrow 7} \frac{5x}{\sqrt{x+2}}$

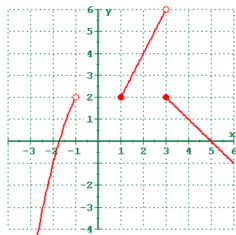
$= \frac{5 \cdot 7}{\sqrt{7+2}} = \frac{35}{\sqrt{9}} = \frac{35}{3}$

$= \lim_{x \rightarrow 4} \frac{\sqrt{x+5} - 3}{(x-4)(\sqrt{x+5} + 3)}$
 $= \frac{1}{\sqrt{9+3}} = \frac{1}{3+3} = \frac{1}{6}$

5. $\lim_{x \rightarrow 0} \frac{\sin x}{x}$

1

8. Fill in the blank: A function f is continuous at c if $\lim_{x \rightarrow c} f(x) = f(c)$.



Assume that the graph to the left is $f(x)$.

Find:

9. $\lim_{x \rightarrow 3} f(x)$ **6**

10. $\lim_{x \rightarrow 3^+} f(x)$ **2**

Discuss the continuity of the following functions. State which discontinuities are removable and which are non-removable, and state the intervals on which the function is continuous.

11. $f(x) = \frac{x+2}{x^2 - 3x - 10} = \frac{x+2}{(x+2)(x-5)} = \frac{1}{x-5}, x \neq -2$

removable @ -2

nonremovable @ 5

cts on: $(-\infty, -2) \cup (-2, 5) \cup (5, \infty)$

12. $f(x) = \begin{cases} \frac{1}{2}x + 1, & x \leq 2 \\ 3 - x, & x > 2 \end{cases}$

non-removable disc. @ 2

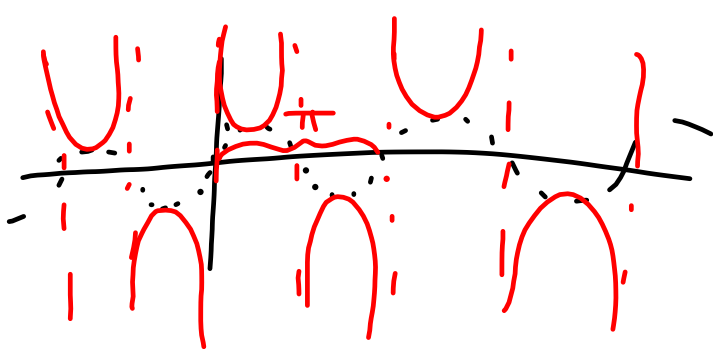
cts on $(-\infty, 2] \cup (2, \infty)$

Test Wednesday on Limits

1.4

51. $f(x) = \csc 2x$
period: π

f is continuous
on intervals of
the form

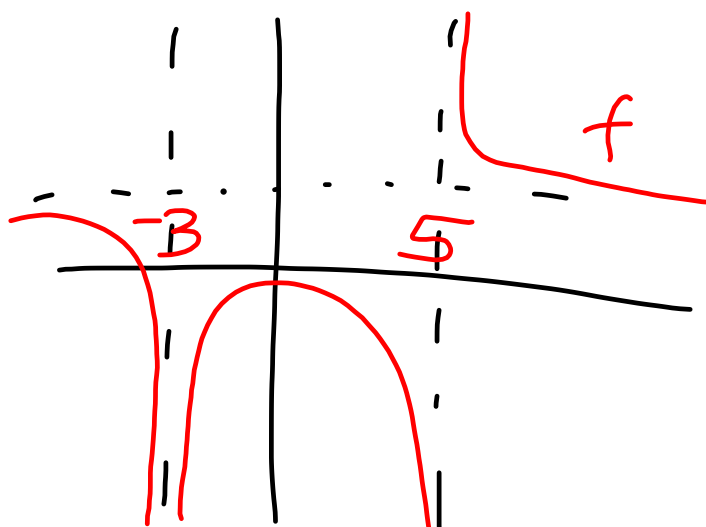


$$\left(\frac{k\pi}{2}, \frac{(k+1)\pi}{2} \right)$$

$$23. \lim_{x \rightarrow 3} (2 - \lfloor -x \rfloor) \quad \text{does not exist}$$

$$\begin{aligned} \lim_{x \rightarrow 3^+} (2 - \lfloor -x \rfloor) &= 2 - \lfloor -3.001 \rfloor \\ &= 2 - (-4) = 6 \end{aligned}$$

$$\begin{aligned} \lim_{x \rightarrow 3^-} (2 - \lfloor -x \rfloor) &= 2 - \lfloor -2.999 \rfloor = \\ &= 2 - (-3) = 5 \end{aligned}$$



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

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

$$\lim_{x \rightarrow 5} f(x) = \text{does not exist}$$

$$\lim_{x \rightarrow 7^+} g(x) = \infty$$

