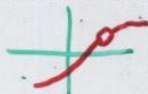
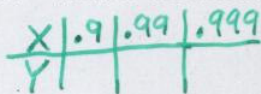


Chapter 1 - Limits

1. What is a limit?

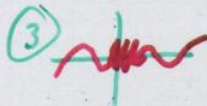
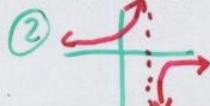
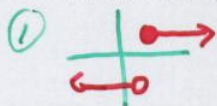
The value you are approaching from both sides of an equation

2. What is the difference between a numerical, graphical, or analytical limit?



$$\lim_{x \rightarrow 2} \frac{(x-2)(x+2)}{x-2} = 4$$

3. What are three limits that fail to exist?



4. What are two strategies for finding limits analytically?

① $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2}$

② $\lim_{x \rightarrow 0} \frac{\sqrt{x+1} - 1}{x}$

5. What are the two special Trigonometric limits?

① $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$ or $\lim_{x \rightarrow 0} \frac{x}{\sin x} = 1$

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

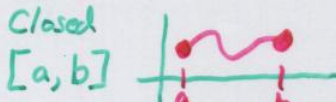
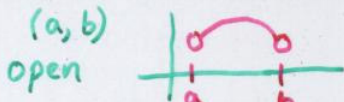
6. What three factors cause discontinuity?

① $f(x)$ is undefined

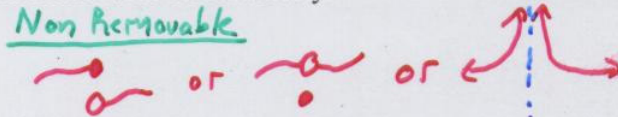
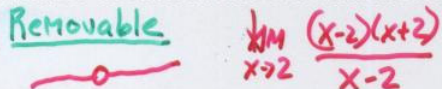
② \lim does not exist

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

7. What is the difference between an open and closed interval?



8. What is the difference between a removable and non-removable discontinuity?



9. What is a one-sided limit?

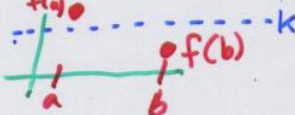
The value if you approach from either the left or right
 (Negative) (Positive) $\lim_{x \rightarrow c^-} f(x)$

10. How do you know if a limit exists?

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

11. Describe the Intermediate Value Theorem?

If f is continuous on $[a, b]$, and K is any # bet. $f(a)$ & $f(b)$, then there is at least 1 # c in $[a, b]$ such that $f(c) = K$



12. What is an infinite limit?

a limit that goes on without bound



13. How do you know if there is a vertical asymptote?

There is an infinite limit from both sides.

$$h(x) = \frac{f(x)}{g(x)}$$

$$f(x) \neq 0 \text{ \& \; } g(x) = 0$$

no removable discontinuities