§1.4 (finish first), then §1.6 continuity
↓
page 3 Monday.

§1.6
Recall, \( f(x) \) is continuous at \( x = c \) means \( \lim_{x \to c} f(x) = f(c) \)

Exercise 1
Let \( f(x) = \begin{cases} 
  x^2 + 1 & x \leq 1 \\
  -x + 3 & x > 1 
\end{cases} \)

(a) Sketch the graph of \( f \)
(b) Is \( f(x) \) continuous at \( x = 1 \)?

Exercise 2
Let \( g(x) = \begin{cases} 
  (x-1)^2 + a & x < 2 \\
  x - 2 & x \geq 2 
\end{cases} \)

For what value of \( a \) is \( g(x) \) continuous at \( x = 2 \)?
Exercise 3: Let $f(x) = \frac{x^3 - 3x^2 + 2}{x^2 - 1}$

(a) What is the natural domain of $f$?

(b) Can you define $f(1)$ so that $f(x)$ is continuous at $x = 1$?

(c) Can you define $f(-1)$ to make $f(x)$ continuous at $x = -1$?

Exercise 4: Let $f(x) = \begin{cases} \frac{|x|}{x} & x \neq 0 \\ 1 & x = 0 \end{cases}$

(a) Is $f(x)$ continuous at $x = 0$?

(b) Sketch $y = f(x)$
Exercise 5 \( \text{Let } f(x) = \begin{cases} x \sin \frac{1}{x} , & x \neq 0 \\ 0 & x = 0 \end{cases} \)

(a) Is \( f(x) \) continuous at \( x = 0 \)?

(b) Can you make a rough sketch of the graph of \( f \)?

Exercise 6 \( \text{The graph of a function } y = f(x) \text{ is shown. Discuss the continuity of } f(x) \text{. At points where } f \text{ is not continuous, is it continuous from the right, or from the left? } \lim_{x \to c} f(x) = f(c) \), \( \lim_{x \to c^+} f(x) = f(c) \), \( \lim_{x \to c^-} f(x) = f(c) \).