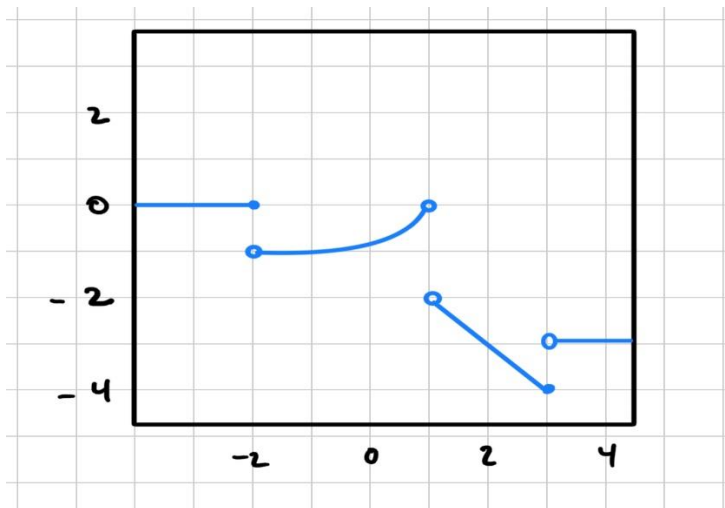# Lab Worksheet for November 1, 2021

Practice with limits .

1. Let *f* be a function and *a* be a number. What does it mean for *f* to be continuous at *a*?

2. Below is a graph of a function f(x).

Based on the graph, find the following one-sided limits.

a) $\lim_{x \to -2^-} f(x)$.

b) $\lim_{x \to -2^+} f(x)$.

c) $\lim_{x \to 1^-} f(x)$.

d) $\lim_{x \to 1^+} f(x)$.

e) $\lim_{x \to 3^-} f(x)$.

f) $\lim_{x \to 3^+} f(x)$.

g) What is f(-2)?

h) What is f(1)?

i) What is f(3)?

3. Consider the following function.

$$f(x) = \begin{cases} cos(x), x < 0 \\ sin(x), x > 0 \end{cases}$$

a) What is the limit of f(x) as you approach 0 from the left side?

b) What is the limit of f(x) as you approach 0 from the right side?

c) Do your answers from part a and part b agree?

d) What is the limit of f(x) as you approach 0?

e) Is f(x) continuous at 0?

4. Consider the following function.

$$f(x) = \begin{cases} x^2, x \geq 1 \\ x^3, x < 1 \end{cases}$$

a) What is the limit of f(x) as you approach 1 from the left side?

b) What is the limit of f(x) as you approach 1 from the right side?

c) Do your answers from part a and part b agree?

d) What is the limit of f(x) as you approach 1?

e) Is f(x) continuous at 1?

5. Consider the following function.

$$f(x) = \begin{cases} x^2 - 2, & x < 2 \\ x, & x > 2 \end{cases}$$

a) What is the limit of f(x) as you approach 2 from the left side?

b) What is the limit of f(x) as you approach 2 from the right side?

c) Do your answers from part a and part b agree?

d) What is the limit of f(x) as you approach 2?

e) Is f(x) continuous at 2?