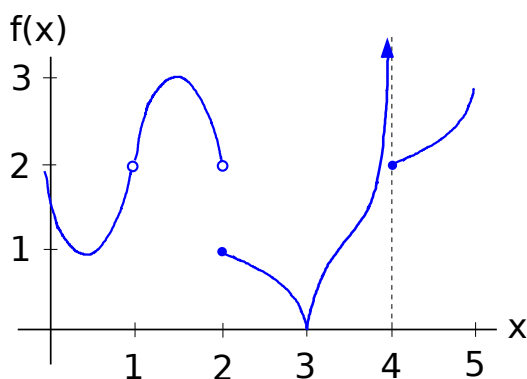


IN-CLASS ACTIVITY : INTRODUCTION TO LIMITS

1. Determine each of the following limits of the function $f(x)$ graphed below. If the limit does not exist, write DNE.



- | | | |
|-------------------------------------|-------------------------------------|---------------------------------------|
| i) $\lim_{x \rightarrow 1^-} f(x)$ | iv) $\lim_{x \rightarrow 2^-} f(x)$ | vii) $\lim_{x \rightarrow 3^-} f(x)$ |
| ii) $\lim_{x \rightarrow 1^+} f(x)$ | v) $\lim_{x \rightarrow 2^+} f(x)$ | viii) $\lim_{x \rightarrow 3^+} f(x)$ |
| iii) $\lim_{x \rightarrow 1} f(x)$ | vi) $\lim_{x \rightarrow 2} f(x)$ | ix) $\lim_{x \rightarrow 3} f(x)$ |

What is the value of the function at $x = 2$? Is $f(1)$ defined?

2. Using a calculator, compute the values of the function $f(x) = \frac{\tan(x)}{x - \pi}$ as x approaches π from the left and from the right. Record the results in a table. Then compute the following limits (if they exist) :

- | | | |
|--------------------------------------|---------------------------------------|--------------------------------------|
| i) $\lim_{x \rightarrow \pi^-} f(x)$ | ii) $\lim_{x \rightarrow \pi^+} f(x)$ | iii) $\lim_{x \rightarrow \pi} f(x)$ |
|--------------------------------------|---------------------------------------|--------------------------------------|

3. Using a calculator, compute the values of the function $f(x) = \frac{|x|}{e^x - 1}$ as x approaches 0 from the left and from the right. Record the results in a table. Then compute the following limits (if they exist) :

- | | | |
|------------------------------------|-------------------------------------|------------------------------------|
| i) $\lim_{x \rightarrow 0^-} f(x)$ | ii) $\lim_{x \rightarrow 0^+} f(x)$ | iii) $\lim_{x \rightarrow 0} f(x)$ |
|------------------------------------|-------------------------------------|------------------------------------|

4. Consider the function $f(x)$ defined by

$$f(x) = \begin{cases} \frac{\sin(2x)}{x} & \text{if } x > 0 \\ 1 & \text{if } x \leq 0 \end{cases}$$

Determine, using a calculator and a table of values, the limits $\lim_{x \rightarrow 0^+} f(x)$ and $\lim_{x \rightarrow 0^-} f(x)$.