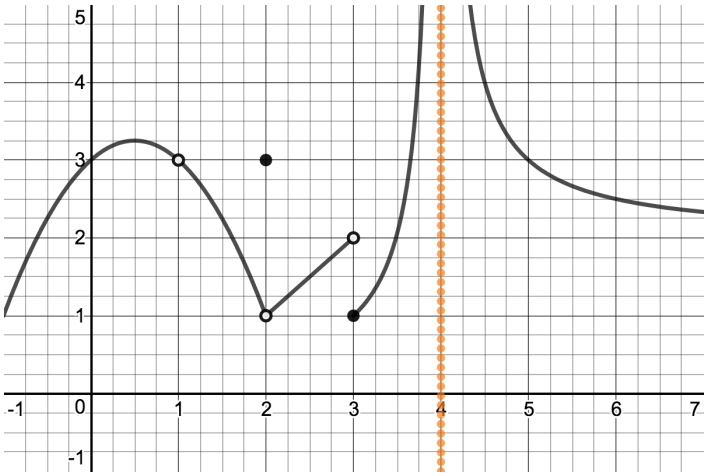
§2.5 (PART 1): CONTINUITY

1.] Consider the graph of a piecewise function $f(x)$ below:



a.) Compute the following:

i. $\lim_{x\to 1^-} f(x)$ *ii.* $\lim_{x\to 1^+} f(x)$ *iii.* $\lim_{x\to 1} f(x)$ *iv.* $f(1)$

b.) Compute the following:

i. $\lim_{x\to 2^-} f(x)$ *ii.* $\lim_{x\to 2^+} f(x)$ *iii.* $\lim_{x\to 2} f(x)$ *iv.* $f(2)$

c.) Compute the following:

i. $\lim_{x\to 3^-} f(x)$ *ii.* $\lim_{x\to 3^+} f(x)$ *iii.* $\lim_{x\to 3} f(x)$ *iv.* $f(3)$

d.) Compute the following:

i. $\lim_{x\to 4^-} f(x)$ *ii.* $\lim_{x\to 4^+} f(x)$ *iii.* $\lim_{x\to 4} f(x)$ *iv.* $f(4)$

e.) Compute the following:

i. $\lim_{x\to 6^-} f(x)$ *ii.* $\lim_{x\to 6^+} f(x)$ *iii.* $\lim_{x\to 6} f(x)$ *iv.* $f(6)$

2.] Determine if the following functions are continuous at c:

a.) $f(x) = \sqrt{x-2}, \qquad c = 1$

b.) $f(x) = \dfrac{2x^2+3x+1}{x^2+5x}, \qquad c = 5$

c.) $f(x) = \begin{cases} \dfrac{x^2+x}{x+1} & \text{if } x \neq -1 \\ 2 & \text{if } x = -1 \end{cases}, \qquad c = -1$

d.) $f(x) = \begin{cases} \dfrac{x^2-4}{x^2-5x-14} & \text{if } x < 7 \\ 2\sqrt{x+2}-4 & \text{if } x \geq 7 \end{cases}, \qquad c = 7$

e.) $f(x) = \begin{cases} \dfrac{x^2-4x+3}{x-3} & \text{if } x < 3 \\ 2 & \text{if } x = 3 \\ 2^{2x-3}-2x & \text{if } x > 3 \end{cases}, \qquad c = 3$

f.) $= \begin{cases} \sin(x) & \text{if } x < \frac{\pi}{2} \\ \tan\left(x - \frac{\pi}{4}\right) & \text{if } x \geq \frac{\pi}{2} \end{cases}, \qquad c = \dfrac{\pi}{2}$