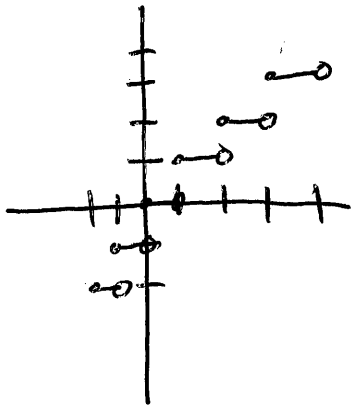


Ch. 1.4 Additional Notes:

Greatest Integer Function $\lfloor x \rfloor$ or $\lceil x \rceil =$ largest integer $\leq x$

$y = \lfloor x \rfloor$ * floor functions



$$\lfloor 4 \rfloor = 4$$

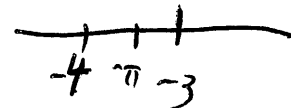
$$\lfloor 4.8 \rfloor = 4$$

$$\lfloor -\pi \rfloor = -4$$

-3.14

$$23) \lim_{x \rightarrow 4^-} 5 \lfloor x \rfloor - 7$$

3.9



$$5 \lfloor 3.9 \rfloor - 7 = 5(3) - 7 = \boxed{8}$$

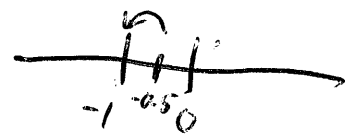
$$25) \lim_{x \rightarrow 3} (2 - \lfloor -x \rfloor)$$

$$\lim_{x \rightarrow 3^-} 2 - \lfloor -x \rfloor = 2 - (-3) = 5$$

$$\lim_{x \rightarrow 3^+} 2 - \lfloor -x \rfloor = 2 - (-4) = 6$$

DNE

$$26) \lim_{x \rightarrow 1} \left(1 - \lfloor \frac{-x}{2} \rfloor \right) = 2$$



$$\lim_{x \rightarrow 1^-} \left(1 - \lfloor \frac{-x}{2} \rfloor \right) = (1 - (-1)) = 2$$

-0.9/2

$$\lim_{x \rightarrow 1^+} \left(1 - \lfloor \frac{-x}{2} \rfloor \right) = 2$$

-1.1/2

$1 - (-1) = 2 \checkmark$

Ex. 4) Find x-values where $f(x)$ is not continuous

$$f(x) = \lfloor x - 8 \rfloor$$

x	y
0	-8
0.1	-8
0.5	-8
0.8	-8
0.9	-8
1	-7

$f(x)$ is not continuous at k
 where k is an integer

Ex. 5) Find x-values where $f(x)$ is not continuous

$$f(x) = \lfloor 4x - 5 \rfloor$$

* Test decimal values to determine what increments of x will push expression into the next integer value

x	y
0	-5
1/4	-4
1/2	

x	y
0	-5
* 0.25	-4
0.3	-3.8 → -4
* 0.5	-3
0.6	-2.6 → -3
* 0.75	-2

$f(x)$ is not continuous at $\frac{1}{4}k$ where k is an integer

$$(3) f(x) = \begin{cases} x^3, & x \leq 2 \\ ax^2, & x > 2 \end{cases}$$

$$\lim_{x \rightarrow 2^-} x^3 = \lim_{x \rightarrow 2^+} ax^2$$

$$ax^2 = x^3 \quad \text{at } x=2$$

$$a(2)^2 = 2^3$$

$$4a = 8 \quad \underline{\underline{a=2}}$$

$$(5) f(x) = \begin{cases} 2 & x \leq -1 \\ ax+b & -1 < x < 3 \\ -2 & x \geq 3 \end{cases}$$

$$\begin{array}{l} \text{at } x=-1 \\ ax+b = 2 \end{array}$$

$$-a+b = 2$$

$$b = 2+a$$

$$b = 2-1$$

$$\underline{\underline{b=1}}$$

$$\begin{array}{l} \text{at } x=3 \\ ax+b = -2 \end{array}$$

$$3a+b = -2$$

$$3a+(2+a) = -2$$

$$4a+2 = -2$$

$$4a = -4$$

$$\underline{\underline{a=-1}}$$

$$f(x) = \begin{cases} 2 & x \leq -1 \\ -1x+1 & -1 < x < 3 \\ -2 & x \geq 3 \end{cases}$$

$$(6) g(x) = \begin{cases} \frac{x^2-a^2}{x-a}, & x \neq a \\ 8 & x = a \end{cases}$$

$$\lim_{x \rightarrow a} \frac{x^2-a^2}{x-a} = 8$$

$$\lim_{x \rightarrow a} \frac{(x-a)(x+a)}{(x-a)} = 8$$

$$a+a = 8$$

$$\boxed{a=4}$$

