$$f(x)=\begin{cases}\dfrac{|x-3|}{3-x}, & \\ x^2-3, & -2\le x\le 8\end{cases}$$

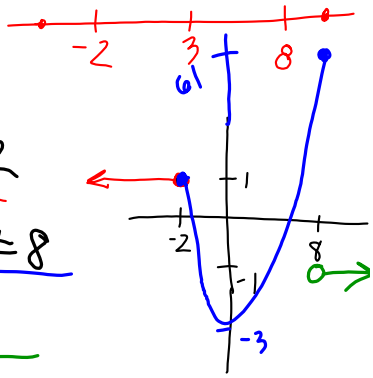
> great OR less than AND <

$|x-3|>5$

$x-3>5$ or $x-3<-5$

$x>8$ or $x<-2$

$$\frac{|x-3|}{3-x}=\begin{cases}\frac{x-3}{3-x}=-1, & x-3>0,\ x>3\\ \frac{-(x-3)}{3-x}=1, & x-3\le 0,\ x\le 3\end{cases}$$




$$f(x)=\begin{cases}1, & x<-2\\ x^2-3, & -2\le x\le 8\\ -1, & x>8\end{cases}$$



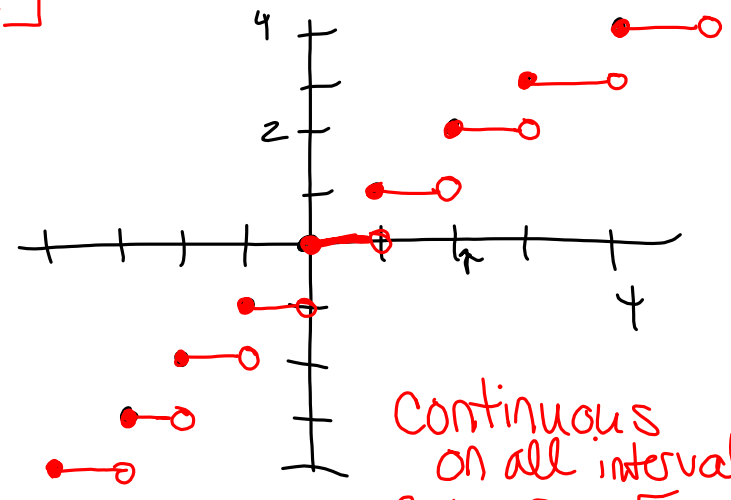

f has a non-removable jump discontinuity @ $x=8$

f is continuous on $(-\infty,8]\cup(8,\infty)$

# The Greatest Integer Function

$[\![x]\!]$ = the greatest integer less than or equal to x

$\lfloor x \rfloor$




"Step Function"

has discontinuities (jump) @ all the integers $\mathbb{Z}$

Continuous on all intervals of the form $[n,n+1)$, $n\in\mathbb{Z}$

22. $\lim_{x \to 2^+} 2x - [\![x]\!]$

$= \lim_{x \to 2^+} 2x - \lim_{x \to 2^+} [\![x]\!]$

$= 4 - 2 = \boxed{2}$