

Notes: Day 7

AP Calculus-AB

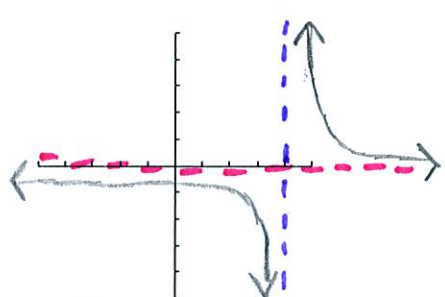
Notes: Graphs from limits

Steps:

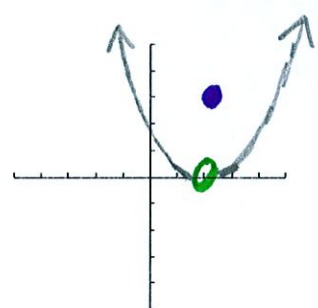
- You always label each piece:
 - $\lim_{x \rightarrow c} f(x) = \pm\infty \implies$ Then **VA: $x=c$**
 - EB** $\lim_{x \rightarrow \pm\infty} f(x) = L \implies$ Then **HA: $y=L$**
 - $\lim_{x \rightarrow c} f(x) = L \implies$ Then **(c, L) open circle**
 - $f(x) = y \implies$ Then **(x, y) filled in circle**
- Graph VA, HA, open, and closed circles
- Graph behavior at VA and open circles ($\lim_{x \rightarrow c} f(x) = L$)
- Graph end behavior

Example(s) 1: Using the given limits, sketch a graph.

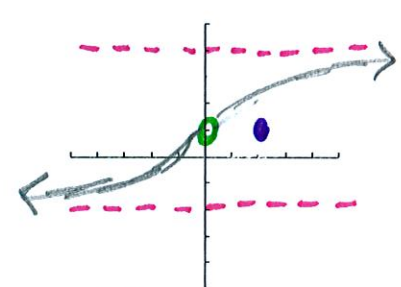
A.) **EB** $\lim_{x \rightarrow \infty} f(x) = 0$ **HA: $y=0$**
 $\lim_{x \rightarrow 4^+} f(x) = \infty$ **VA: $x=4$**
 $\lim_{x \rightarrow 4^-} f(x) = -\infty$
EB $\lim_{x \rightarrow -\infty} f(x) = 0$ **HA: $y=0$**



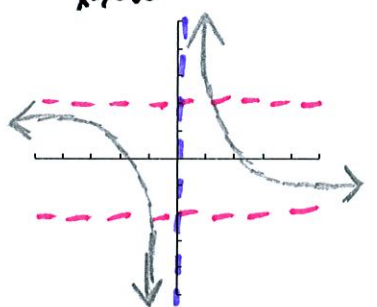
B.) **EB** $\lim_{x \rightarrow \infty} f(x) = \infty$ **(Right, up)**
 $\lim_{x \rightarrow 2} f(x) = 0$ **$(2, 0)$ open circle**
EB $\lim_{x \rightarrow -\infty} f(x) = \infty$ **(left, up)**
 $f(2) = 3$ **$(2, 3)$ closed circle**



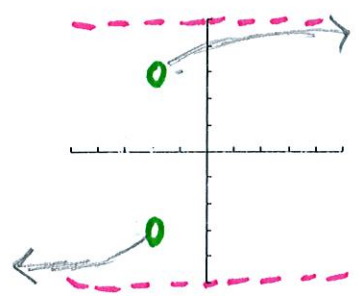
C.) **EB** $\lim_{x \rightarrow \infty} f(x) = 4$ **HA: $y=4$**
 $\lim_{x \rightarrow 0^+} f(x) = 1$ **open circle $(0, 1)$**
 $\lim_{x \rightarrow 0^-} f(x) = 1$ **$(0, 1)$**
EB $\lim_{x \rightarrow -\infty} f(x) = -2$ **HA: $y=-2$**
 $f(2) = 1$ **$(2, 1)$ closed circle**



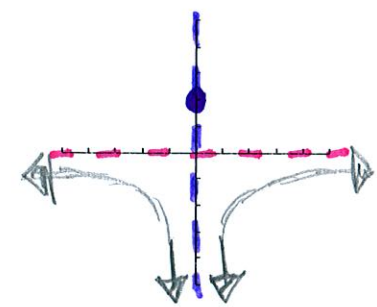
D.) **EB** $\lim_{x \rightarrow \infty} f(x) = -2$ **HA: $y=-2$**
 $\lim_{x \rightarrow 0^+} f(x) = \infty$ **VA: $x=0$**
 $\lim_{x \rightarrow 0^-} f(x) = -\infty$
EB $\lim_{x \rightarrow -\infty} f(x) = 2$ **HA: $y=2$**



E.) **EB** $\lim_{x \rightarrow \infty} f(x) = 5$ **HA: $y=5$**
 $\lim_{x \rightarrow 2^+} f(x) = 3$ **$(2, 3)$ open circle**
 $\lim_{x \rightarrow 2^-} f(x) = -3$ **$(2, -3)$ open circle**
EB $\lim_{x \rightarrow -\infty} f(x) = -5$ **HA: $y=-5$**



F.) **EB** $\lim_{x \rightarrow \infty} f(x) = 0$ **HA: $y=0$**
 $\lim_{x \rightarrow 0} f(x) = -\infty$ **VA: $x=0$**
EB $\lim_{x \rightarrow -\infty} f(x) = 0$ **HA: $y=0$**
 $f(0) = 2$ **$(0, 2)$ closed circle**

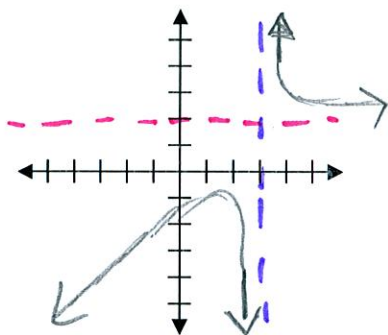


Lets practice more of these:

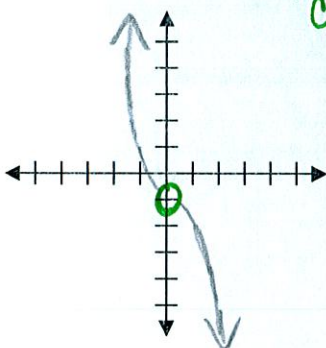
Graphs from Limits #1

Using the given limits, sketch a graph.

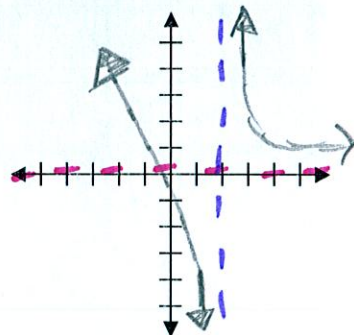
1. $\lim_{x \rightarrow \infty} f(x) = 2$ HA: $y=2$
 $\lim_{x \rightarrow 3^+} f(x) = \infty$ VA: $x=3$
 $\lim_{x \rightarrow 3^-} f(x) = -\infty$
 $\lim_{x \rightarrow -\infty} f(x) = -\infty$ (left, down)



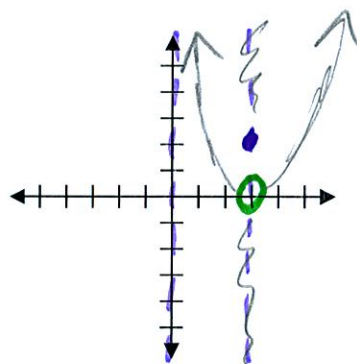
2. $\lim_{x \rightarrow \infty} f(x) = -\infty$ right down
 $\lim_{x \rightarrow -\infty} f(x) = \infty$ left up
 $\lim_{x \rightarrow 0^-} f(x) = -1$
 $\lim_{x \rightarrow 0^+} f(x) = -1$ $(0, -1)$ open circle



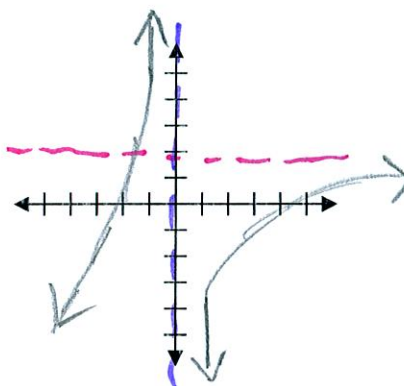
3. $\lim_{x \rightarrow \infty} f(x) = 0$ HA: $y=0$
 $\lim_{x \rightarrow 2^+} f(x) = \infty$ VA: $x=2$
 $\lim_{x \rightarrow 2^-} f(x) = -\infty$
 $\lim_{x \rightarrow -\infty} f(x) = \infty$ (left, up)



4. $\lim_{x \rightarrow \infty} f(x) = \infty$ (right, up)
 $\lim_{x \rightarrow 3^+} f(x) = 0$ $(3, 0)$
 $\lim_{x \rightarrow 3^-} f(x) = 0$
 $\lim_{x \rightarrow -\infty} f(x) = \infty$ (left, up)
 $f(3) = 2$ $(3, 2)$



5. $\lim_{x \rightarrow \infty} f(x) = 2$ $y=2$
 $\lim_{x \rightarrow 0^+} f(x) = -\infty$ $x=0$
 $\lim_{x \rightarrow 0^-} f(x) = \infty$
 $\lim_{x \rightarrow -\infty} f(x) = -\infty$ (left, down)



6. $\lim_{x \rightarrow \infty} f(x) = \infty$ (right up)
 $\lim_{x \rightarrow 0^+} f(x) = 3$ $(0, 3)$
 $\lim_{x \rightarrow 0^-} f(x) = -2$ $(0, -2)$
 $\lim_{x \rightarrow -\infty} f(x) = -\infty$ (left down)

