1.1 Concept of a Limit

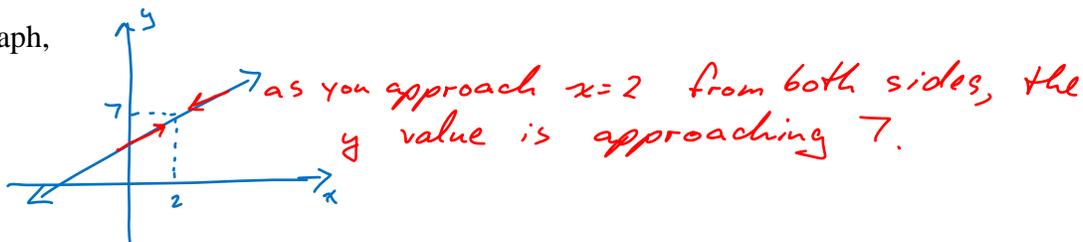A limit is a _bound that a function can approach (maybe even equal)_

We can work with graphs, equations & technology to find limits.

e.g. $\lim_{x\to 2}(x+5) = ?$ *limit, as x approaches 2, of x+5.*

With a calculator, we just substitute in _numbers close to 2 (1.9, 1.99, 2.1, 2.01)_

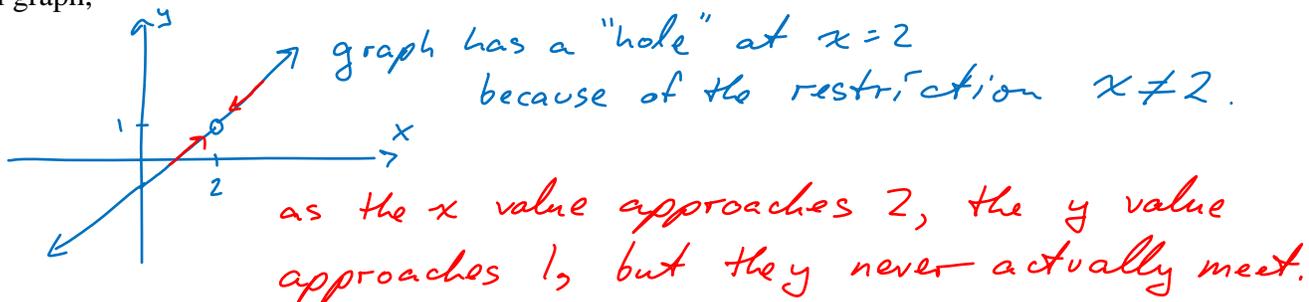and we see that the limit is ___7___.

From a graph,

as you approach x=2 from both sides, the y value is approaching 7.

- and once again, the limit is ___7___.

We could have just _substituted in x=2_, as the graph is _continuous._

Example 1:   find $\lim_{x\to 2}\left(\dfrac{x^2-4}{x-2}-3\right) = 1$

From calculator,   *plug in 1.9, 1.99, 1.999 ....*
                   2.1, 2.01, 2.001

From graph,

graph has a "hole" at x=2 because of the restriction x≠2.

as the x value approaches 2, the y value approaches 1, but they never actually meet.

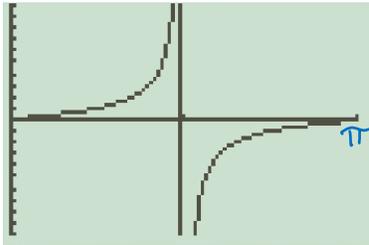***Example 2:***   find $\lim\limits_{x\to\frac{\pi}{2}} \tan x =$

From calculator,   substitute in numbers closer & closer

to $x = 1.570796327$ and the

y value gets bigger & bigger.

(is the limit ∞ ?)

X	Y₁
1.5	14.101
1.57	1255.8
1.5707	10381
1.5708	158058

X=

If you sub in numbers <u>greater</u> than $\frac{\pi}{2}$, the
y value will approach $-\infty$.

From graph,

Left side goes up to ∞, and
the right side goes down to $-\infty$.
As the two sides are not approaching
the same number, there is <u>no Limit</u>.

Assignment: p. 68#5-15 odds, 35, 36