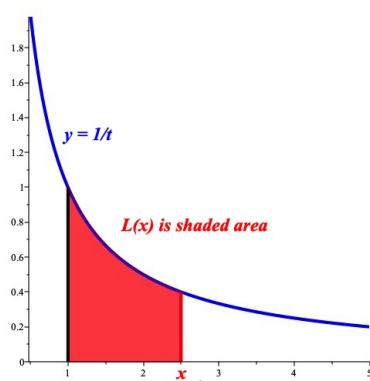


MATH 122: Calculus II  
*What We Know About the Function  $L(x)$*

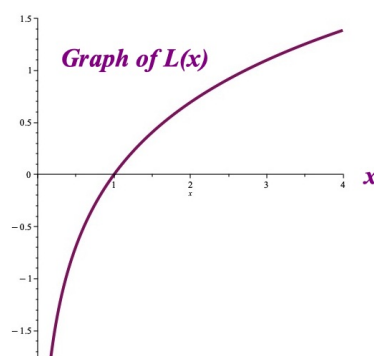
Definition:  $L(x) = \int_1^x \frac{1}{t} dt$ , for  $x > 0$

$L$  IS NOT THE RECIPROCAL FUNCTION.

IT IS THE INTEGRAL  
 OF THE RECIPROCAL FUNCTION



Definition of  $L(x)$



Graph of  $L(x)$

1.  $L(1) = 0$
2.  $L'(x) = \frac{1}{x} > 0$  so graph of  $L$  is strictly increasing  
 Note:  $L$  has an inverse function
3.  $L''(x) = \frac{-1}{x^2} < 0$  so graph of  $L$  is concave down.
4.  $\frac{1}{2} < L(2) < 1$
5.  $L(x^r) = rL(x)$  for any constant  $r$
6.  $L(2^{2^n}) = 2^n L(2) > n$  so  $L$  is unbounded.  
 For every  $M > 0$  there is some  $x$  so  $L(x) > M$ .
7.  $L(ab) = L(a) + L(b)$