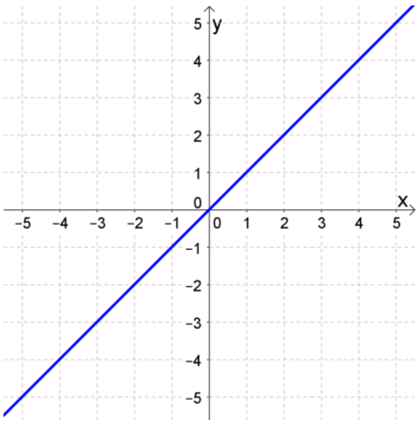
Precalculus

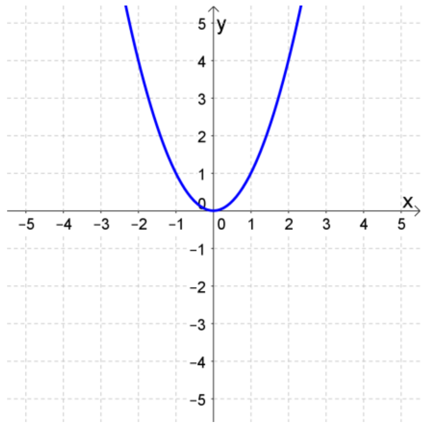
Functions and Their Graphs

Use your Memory Practice Log paper to cover up the graphs as you go down this sheet.
Then go backwards—covering up the formulas as you go up the sheet.

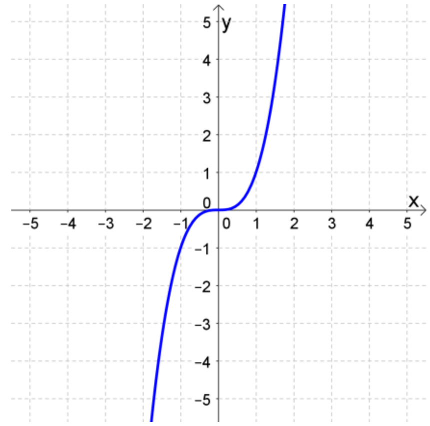
$f(x) = x$



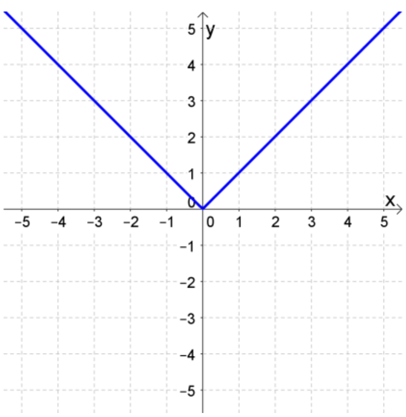
$f(x) = x^2$



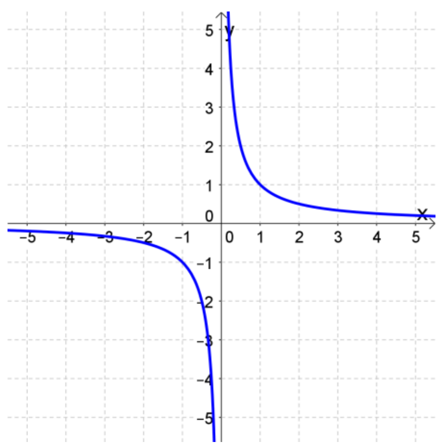
$f(x) = x^3$



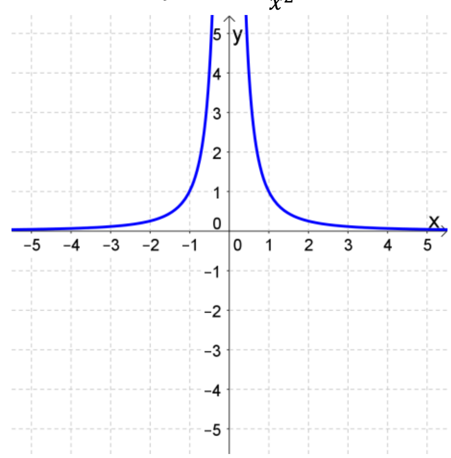
$f(x) = |x|$



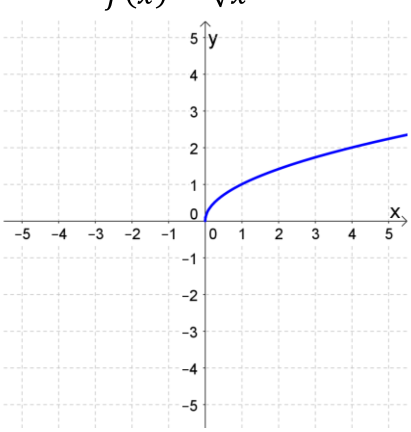
$f(x) = \frac{1}{x}$



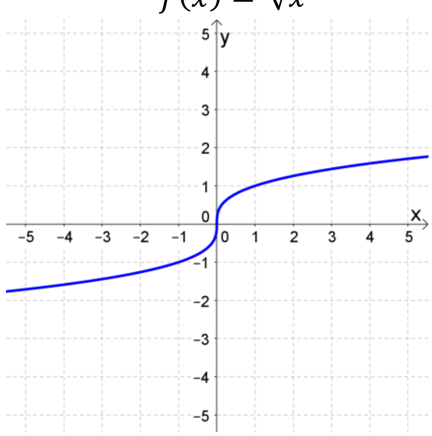
$f(x) = \frac{1}{x^2}$



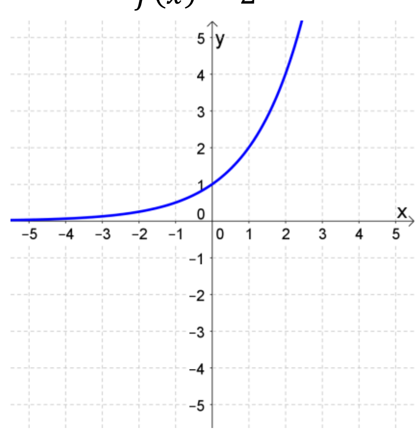
$f(x) = \sqrt{x}$



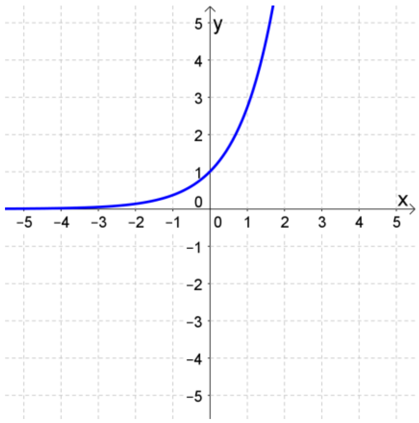
$f(x) = \sqrt[3]{x}$



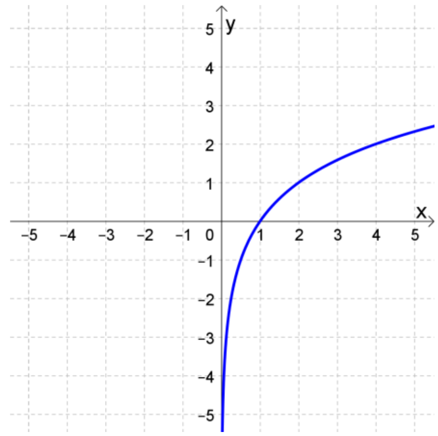
$f(x) = 2^x$



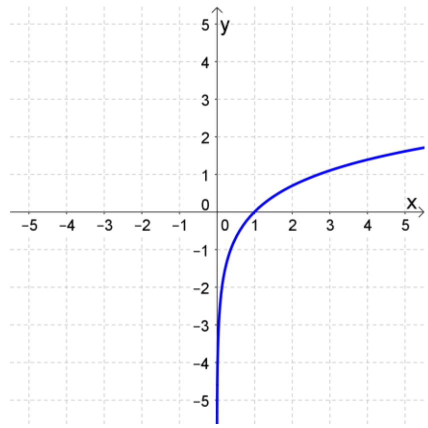
$f(x) = e^x$



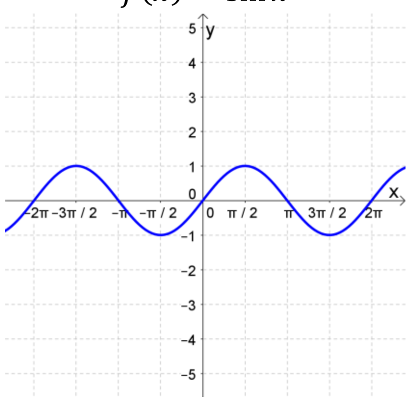
$f(x) = \log_2 x$



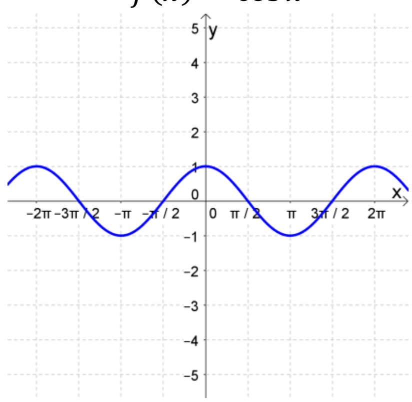
$f(x) = \ln x$



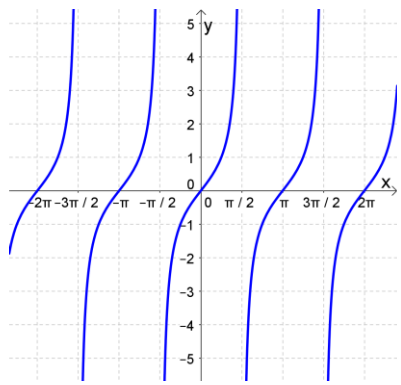
$f(x) = \sin x$



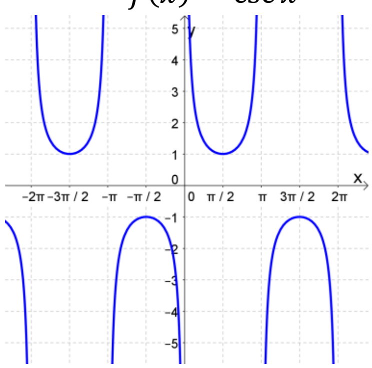
$f(x) = \cos x$



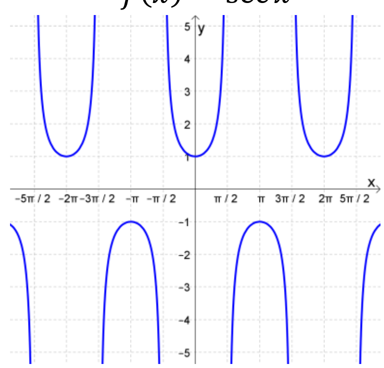
$f(x) = \tan x$



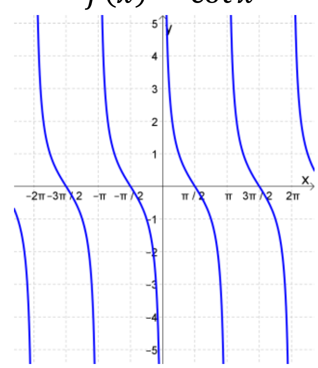
$f(x) = \csc x$



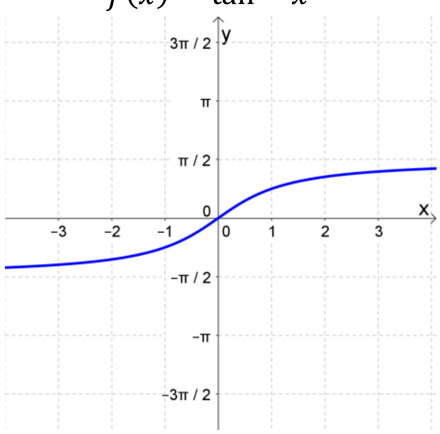
$f(x) = \sec x$



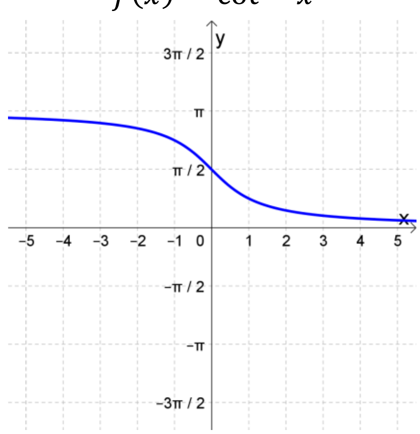
$f(x) = \cot x$



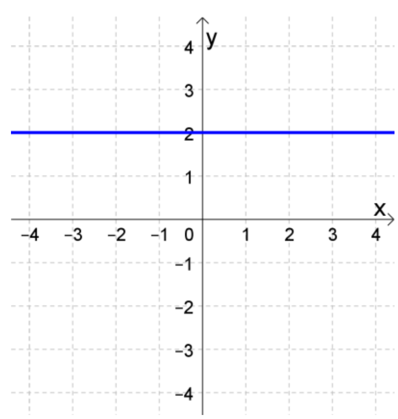
$f(x) = \tan^{-1} x$



$f(x) = \cot^{-1} x$



$f(x) = 2$



Things to Evaluate

Use the Memory Practice Log to cover up the right side of the table.

$\frac{1}{0}$	undefined	When the zero is **<u>Under</u>**, it's **<u>Unde</u>**fined
$\frac{0}{1}$	$= 0$	When the zero is **<u>O</u>**ver it's **<u>0</u>** (zero)
$2^0 =$	1	Any nonzero number raised to the zero is equal to 1
$e^0 =$	1	Any nonzero number raised to the zero is equal to 1
$e^1 \approx$	2.7	e is just a number, like π
$\ln 1 =$	0	Since $e^0 = 1$
$\ln e =$	1	Since $e^1 = e$
$\sin 0 =$	0	The y coordinate of $(1,0)$ on the unit circle is 0
$\cos 0 =$	1	The x coordinate of $(1,0)$ on the unit circle is 1
$\tan 0 =$	0	$\frac{y}{x}$ of $(1,0)$ on the unit circle is $\frac{0}{1} = 0$
$\tan^{-1} 0 =$	0	Since $\tan 0 = 0$
$\tan^{-1} 1 =$	$\frac{\pi}{4}$	Since $\tan \frac{\pi}{4} = 1$

Function Transformations

Use the Memory Practice Log to cover up the right two columns of the table.

Then go backwards—cover up the left column.

For a function $f(x)$, and $c > 0$…

$f(x) + c$	Shifts up by c	Add c to y-values
$f(x) - c$	Shifts down by c	Subtract c from y-values
$cf(x)$	If $c > 1$, stretches vertically If $0 < c < 1$, shrinks vertically	Multiply y-values by c
$-f(x)$	Reflects about x-axis	Multiply y-values by -1
$f(x - c)$	Shifts right by c	**Add c to x-values**
$f(x + c)$	Shifts left by c	**Subtract c from x-values**
$f(cx)$	If $0 < c < 1$, stretches horizontally If $c > 1$, shrinks horizontally	**Multiply x-values by $\frac{1}{c}$**
$f(-x)$	Reflects about y-axis	Multiply x-values by -1

Note: Pay special attention to $f(x - c)$, $f(x + c)$, and $f(cx)$.