How to select critical points when graphing a logarithm:

You always want the argument of the log (the stuff in parenthesis following the word "log") to be a power of the base of the logarithm.

For: $f(x) = log_4 (3x + 4) - 2$

We want 3x+4 to equal powers of 4, since our log is base 4.

We do this by setting 3x + 4 equal to the powers of 4 and solving for x:

Power of 4	Expression	Equation	Solved for x	Solve for f(x) $f(x) = log_4 (3x + 4) - 2$ (see below for work)	Coordinate to plot on graph
0	$4^0 = 1$	3x + 4 = 1	x = – 1	f(– 1) = – 2	(–1, –2)
1	$4^1 = 4$	3x + 4 = 4	x = 0	f(0) = – 1	(0, –1)
2	$4^2 = 16$	3x + 4 = 16	x = 4	f(4) = 0	(4, 0)
3	$4^3 = 64$	3x + 4 = 64	x = 20	f(20) = 1	(20, 1)

$f(- 1) = log_4 (3(- 1) + 4) - 2 = log_4(1) - 2 = 0 - 2 = - 2$

$f(0) = log_4 (3(0) + 4) - 2 = log_4(4) - 2 = 1 - 2 = - 1$

$f(4) = log_4 (3(4)x + 4) - 2 = log_4(16) - 2 = 2 - 2 = 0$

$f(20) = log_4 (3(20)x + 4) - 2 = log_4(64) - 2 = 3 - 2 = 1$

x= -4/3

(20,1)

(4,0)

(0,-1)

(-1,-2)