5. [11 points] Jasen has decided to learn another language. The number of months y that it takes Jasen to learn x thousands of words of the language is given by

$$y = f(x) = -50 \ln \left(\frac{1}{19} (-x + 20) \right).$$

a. [8 points] List the transformations you need to apply (in order!) to the graph of $y = \ln(x)$ to transform it to that of y = f(x) above. Fill in the first blank with one of the phrases below. In the second blank, write a number that represents the appropriate shift or scaling factor; leave it blank if the first blank was a reflection. In the third blank, write an equation for the vertical asymptote of the intermediate graph.

Shift it to	O THE LEFT	STRETCH IT HORIZONTALLY	Reflect it across the y -axis
Shift it to) THE RIGHT	Compress it horizontally	Reflect it across the x -axis
Shift it up	Shift it down	STRETCH IT VERTICALLY	Compress it vertically

We start with $\ln(x)$ (vertical asymptote at x = 0).

First,	by	(vertical asymptote at $x = $).
Then,	by	(vertical asymptote at $x =$).
Then,	by	(vertical asymptote at $x =$).
Then,	by	(vertical asymptote at $x =$).
Then,	by	(vertical asymptote at $x =$).

b. [3 points] Find a formula for $x = f^{-1}(y)$. Show all work.