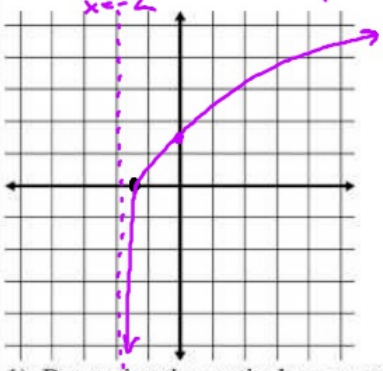
Describe how to transform the graph of $y = \ln x$ into the graph of the given function. Sketch the graph by hand.

a) $g(x) = \ln(x+2)+1$

Left 2 (VA $x=-2$) up 1



1) Determine the vertical asymptotes

$x = -2$

2) Determine the x-intercept ($y=0$)

$y = \ln(x+2)+1$

$0 = \ln(x+2)+1$

$-1 \quad -1$

$-1 = \ln_e(x+2)$

$e^{-1} = x+2$

$x = e^{-1} - 2 \approx -1.632$

3) Determine the domain and range

D: $(-2, \infty)$ R: $(-\infty, \infty)$

4) Intervals of Increase or Decrease

Inc $(-2, \infty)$

5) Determine the end behavior

Left $\lim_{x \to -2} f(x) = -\infty$

Right $\lim_{x \to \infty} f(x) = \infty$

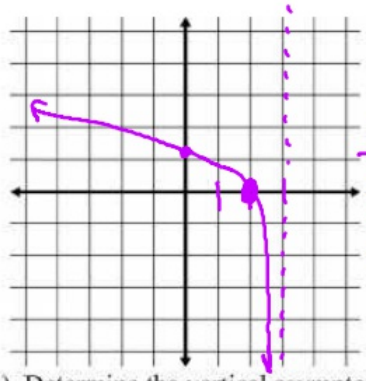
6) Intervals of Concavity

Down $(-2, \infty)$

b) $h(x) = \ln(3-x)$

Right 3, reflect over y-axis

VA



y-int: $\ln 3$, 1.09

1) Determine the vertical asymptotes

$x = 3$

2) Determine the x-intercept

$y = \ln(3-x)$

$0 = \ln_e(3-x)$

$e^0 = 3-x$

$1 = 3-x$

$-3 \quad -3$

$-2 = -x$

$x = 2$

3) Determine the domain and range

D: $(-\infty, 3)$ R: $(-\infty, \infty)$

4) Intervals of Increase or Decrease

Dec: $(-\infty, 3)$

5) Determine the end behavior

Left $\lim_{x \to -\infty} f(x) = +\infty$

Right $\lim_{x \to 3} f(x) = -\infty$

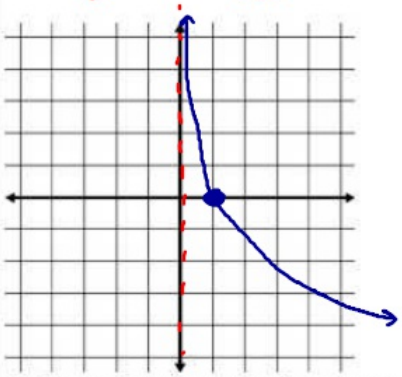
6) Intervals of Concavity

Down $(-\infty, 3)$

Describe how to transform the graph of y = ln x into the graph of the given function. Sketch the graph by hand.

a) $g(x) = -3\log x$

$y = -3\log_{10} x$



1) Determine the vertical asymptotes

$x = 0$

2) Determine the x-intercept

$\frac{0}{-3} = \frac{-3\log_{10} x}{-3}$

$0 = \log_{10} x$

$10^0 = x$

$1 = x$

3) Determine the domain and range

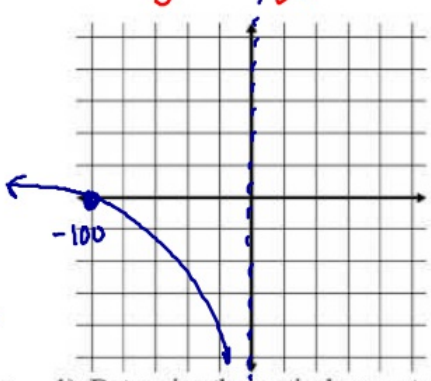
4) Intervals of Increase or Decrease

5) Determine the end behavior

6) Intervals of Concavity

b) $h(x) = \log(-x) - 2$

$y = \log_{10}(-x) - 2$



1) Determine the vertical asymptotes

$x = 0$

2) Determine the x-intercept

$0 = \log_{10}(-x) - 2$

$2 = \log_{10}(-x)$

$10^2 = -x$

$100 = -x$

$-100 = x$

3) Determine the domain and range

4) Intervals of Increase or Decrease

5) Determine the end behavior

6) Intervals of Concavity