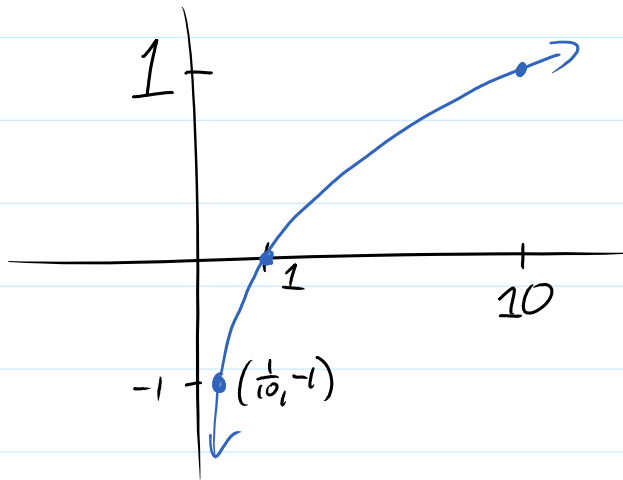


Section 4.2

$$y = \log x = \log_{10} x$$



$$\text{Dom: } (0, \infty)$$

$$\text{Range: } (-\infty, \infty)$$

Ex: Find the domain of

$$f(x) = \ln(3-x)$$

$$\text{need to solve: } 3-x > 0$$

$$3 > x$$

$$-x > -3 \quad (| \cdot (-1))$$

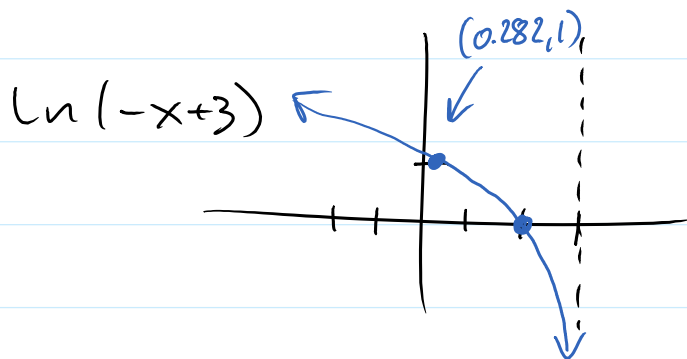
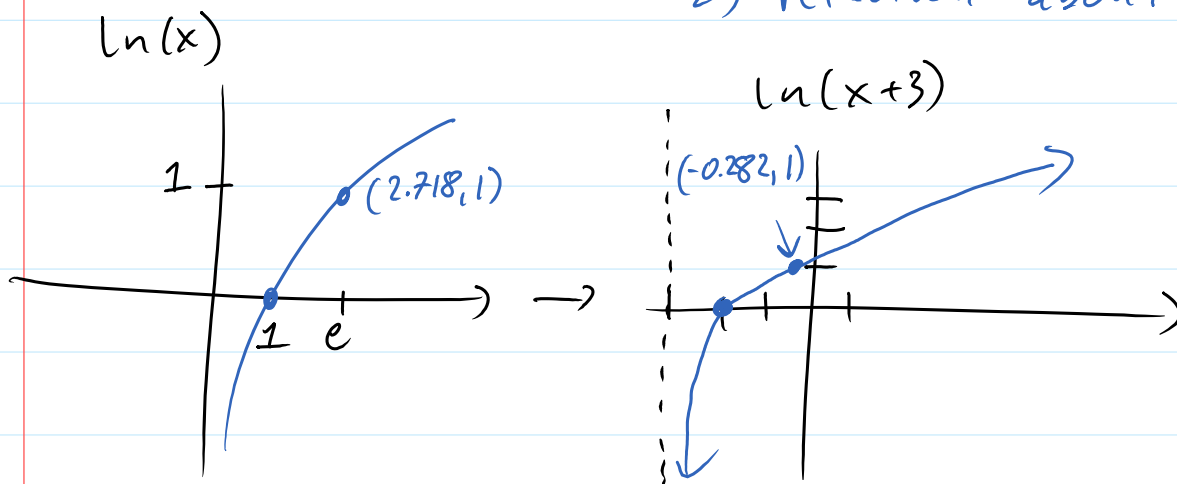
$$x < 3$$

$$\boxed{(-\infty, 3)}$$

$\ln(3-x)$ using trans. on $\ln(x)$

$\ln(-x+3)$

- 1) hor. shift left by 3
- 2) reflection about the y-axis



Find the domain of:

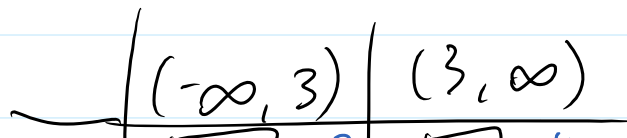
$$g(x) = \ln(x-3)^2 = \ln[(x-3)^2]$$

$$(x-3)^2 > 0$$

$$(x-3)^2 = 0$$

$$x-3 = 0$$

$$x = 3$$



$$x=3 \quad \begin{array}{c|c|c} & (-\infty, 3) & (3, \infty) \\ \hline (x-3)^2 & \boxed{+} & \boxed{+} \end{array}$$

$$\text{Dom: } \boxed{(-\infty, 3) \cup (3, \infty)}$$

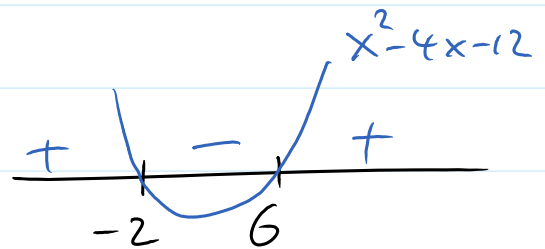
$$h(x) = \ln(x^2 - 4x - 12)$$

$$x^2 - 4x - 12 > 0$$

$$x^2 - 4x - 12 = 0$$

$$(x-6)(x+2) = 0$$

$$x=6 \quad x=-2$$



$$\text{Dom: } \boxed{(-\infty, -2) \cup (6, \infty)}$$

$$f(x) = \log\left(\frac{x-2}{x+5}\right)$$

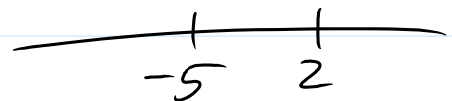
$$\frac{x-2}{x+5} > 0$$

$$x-2=0$$

$$x=2$$

$$x+5=0$$

$$x=-5$$



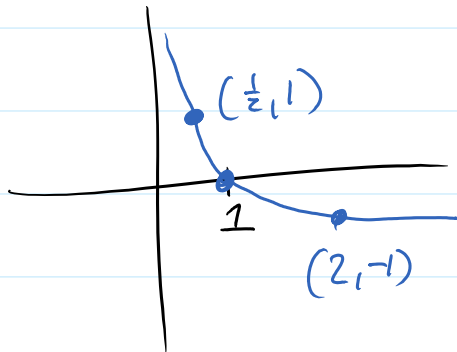
$$\begin{array}{c|c|c} & (-\infty, -5) & (-5, 2) & (2, \infty) \\ \hline & & & \end{array}$$

	$(-\infty, -5)$	$(-5, 2)$	$(2, \infty)$
$(x-2)$	-	-	+
$(x+5)$	-	+	+
$f(x)$	$\boxed{+}$	-	$\boxed{+}$

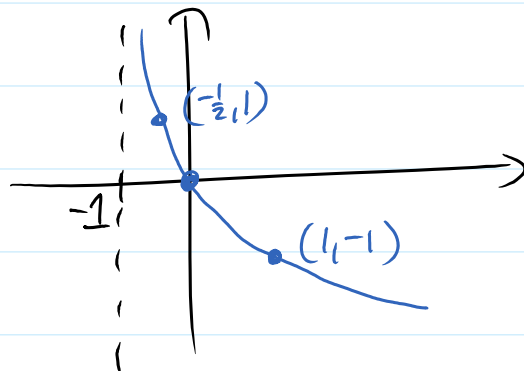
$$\text{Dom: } (-\infty, -5) \cup (2, \infty)$$

Sketch: $f(x) = 3 \log_{\frac{1}{2}}(-x+1)$

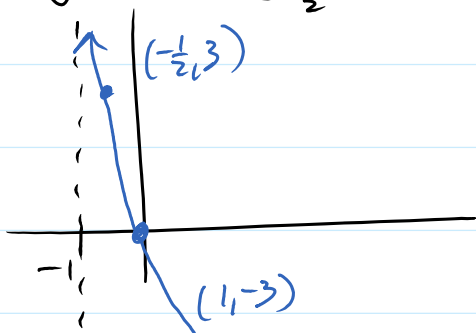
base: $y = \log_{\frac{1}{2}} x$



shift left by 1
 $y = \log_{\frac{1}{2}}(x+1)$



vertical stretch by 3
 $y = 3 \log_{\frac{1}{2}}(x+1)$



reflection about y-axis
 $y = 3 \log_{\frac{1}{2}}(-x+1)$

