HW 23 Solutions

5.3.1 Write as a logarithm

$3^2 = 9 \rightarrow \boxed{\log_3 9 = 2}$

5.3.8

$\log_7 343 = 3 \rightarrow \boxed{7^3 = 343}$

5.3.12 $\log_2 8 = \log_2 2^3 = \boxed{3}$

5.3.21

$\log_9 1 = \log_9 9^0 = \boxed{0}$

5.3.24

$5^{\log_5 M} = X$ means $\log_5 X = \log_5 M$

So $X = M$

Thus, $5^{\log_5 M} = \boxed{M}$

5.3.27

$10^3 = 1000$

$\boxed{\log 1000 = 3}$

5.3.28 $e^{-1} = \frac{1}{e}$

$\boxed{\ln\left(\frac{1}{e}\right) = -1}$

5.3.32

$\ln(1) = 0$

$\boxed{e^0 = 1}$

5.3.33

$\log(1{,}000{,}000) = 6$

$\boxed{10^6 = 1{,}000{,}000}$

5.3.37

$$\log\left(\frac{1}{1000}\right) = \log\left(1000^{-1}\right)$$

$$= \log\left((10)^{-3}\right) = \boxed{-3}$$

5.3.40.

$10^{\log e} = x$

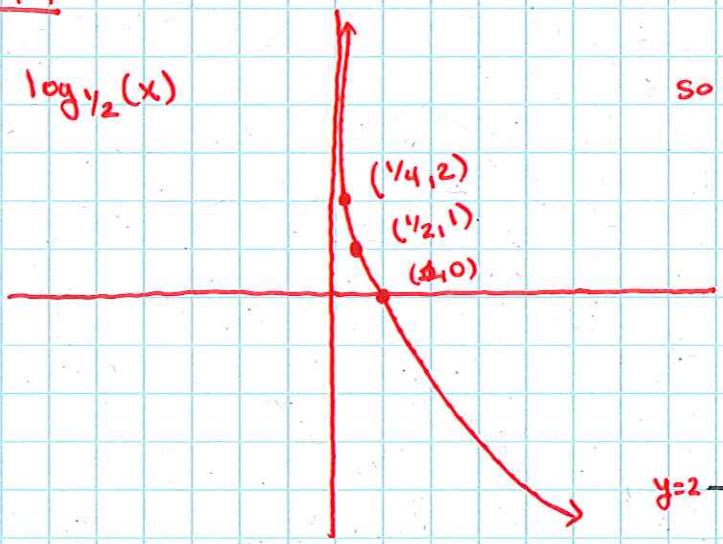
$\hookrightarrow \log_{10} x = \log e$ so $\underline{x = e}$

Thus,

$\boxed{10^{\log e} = e}$

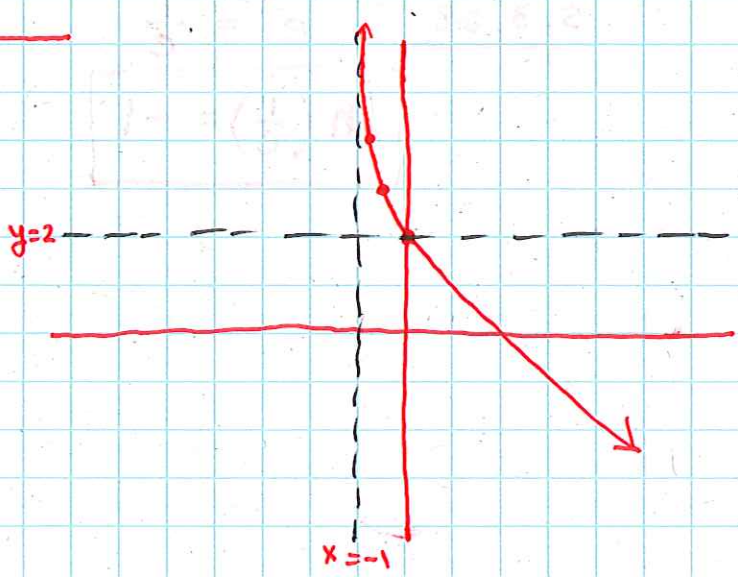
5.3.49

$\log_{1/2}(x)$



so... $y = \log_{1/2}(x+1) + 2$

↑ 1 left ↑ 2 up



5.3.54

$f(x) = \ln(1-3x)$

Domain: $1-3x > 0$

$\Rightarrow \quad -3x > -1$

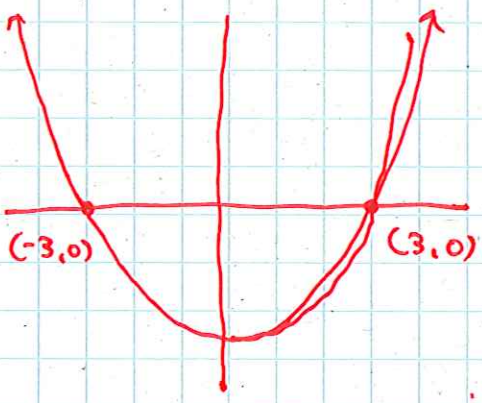
$\Rightarrow \quad \boxed{x < 1/3}$

$$\boxed{\text{Domain} = (-\infty, 1/3)}$$

5.3.55

$f(x) = \log_2(x^2-9)$

$x^2-9 > 0$



So this is true when x is either less than -3 or more than 3.

$$\boxed{\text{Domain} = (-\infty, -3) \cup (3, \infty)}$$