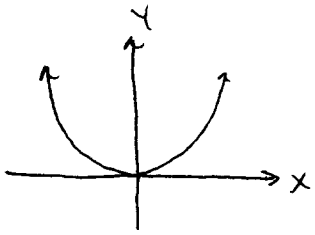
HW #25

Section 6.4

349:1 $Y = X^4$



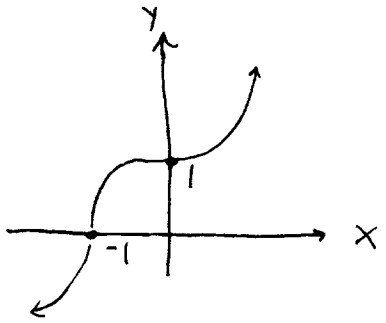
a.) Y is not 1-1 on $[-1,1]$.

b.) Y is 1-1 on $[0,2]$;

$Y = X^4$ switch $X = Y^4 \rightarrow$

$Y = X^{1/4}$ is the inverse function.

349:5 $Y = (1+X^3)^{1/5}$



a.) Y is 1-1 on $(-\infty, +\infty)$.

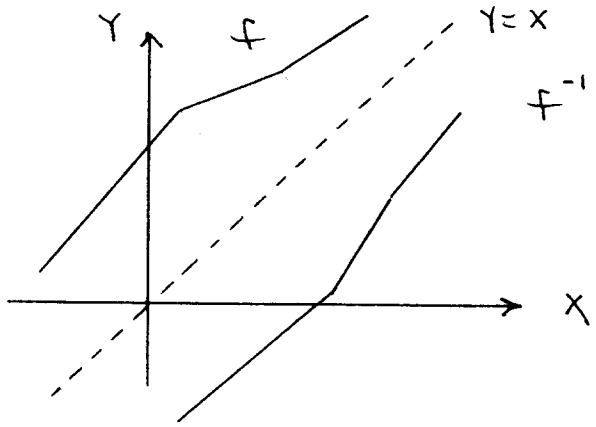
b.) Y is 1-1 on $[0, \infty)$.

$Y = (1+X^3)^{1/5}$ switch

$X = (1+Y^3)^{1/5} \rightarrow X^5 = 1+Y^3 \rightarrow$

$Y^3 = X^5 - 1 \rightarrow Y = (X^5-1)^{1/3}$ is the inverse function.

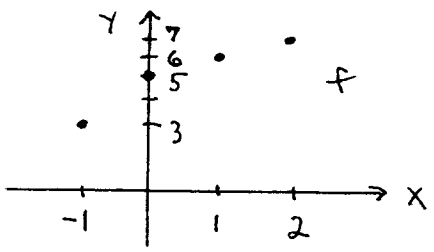
349:9

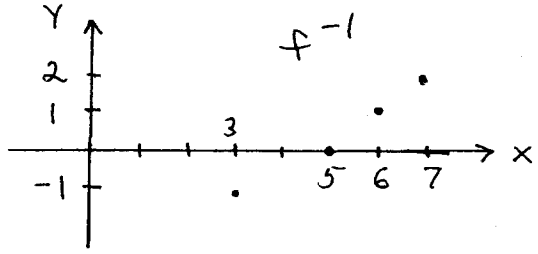


349:11

x	-1	0	1	2
f(x)	3	5	6	7

x	3	5	6	7
$g(x) = f^{-1}(x)$	-1	0	1	2





349:13 $Y = 2^X$ switch $X = 2^Y \rightarrow \ln X = \ln 2^Y$

$\rightarrow \ln X = Y \cdot \ln 2 \rightarrow$

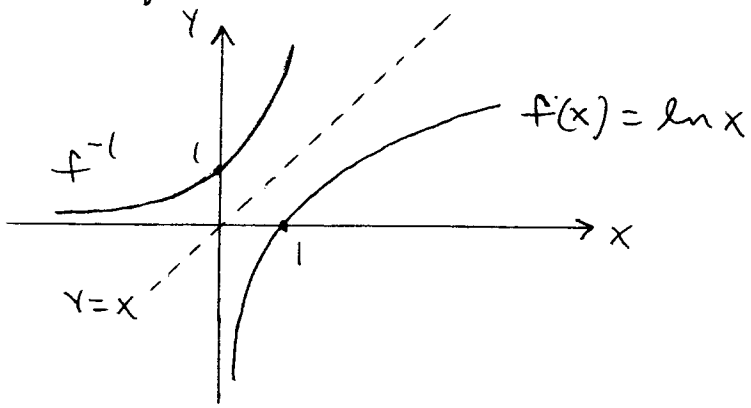
$Y = \frac{\ln X}{\ln 2} = \log_2 X$ is inverse function.

349:14 $Y = \log_2 X$ switch $X = \log_2 Y \rightarrow Y = 2^X$

is inverse function.

349:18 a.) $Y = \ln X \rightarrow Y' = \frac{1}{X} > 0$ for x in $(0, \infty)$ so Y is an increasing function and therefore is one-to-one.

b.)



349:21 a.) $f(x) = x^3 + kx^2 + x$ is 1-1 iff

$f'(x) \geq 0$ iff $3x^2 + 2kx + 1 \geq 0$;

$x = \frac{-2k \pm \sqrt{4k^2 - 12}}{6}$ so we must have

$4k^2 - 12 \leq 0$ (why?) $\rightarrow k^2 \leq 3 \rightarrow$

$-\sqrt{3} \leq k \leq +\sqrt{3}$.