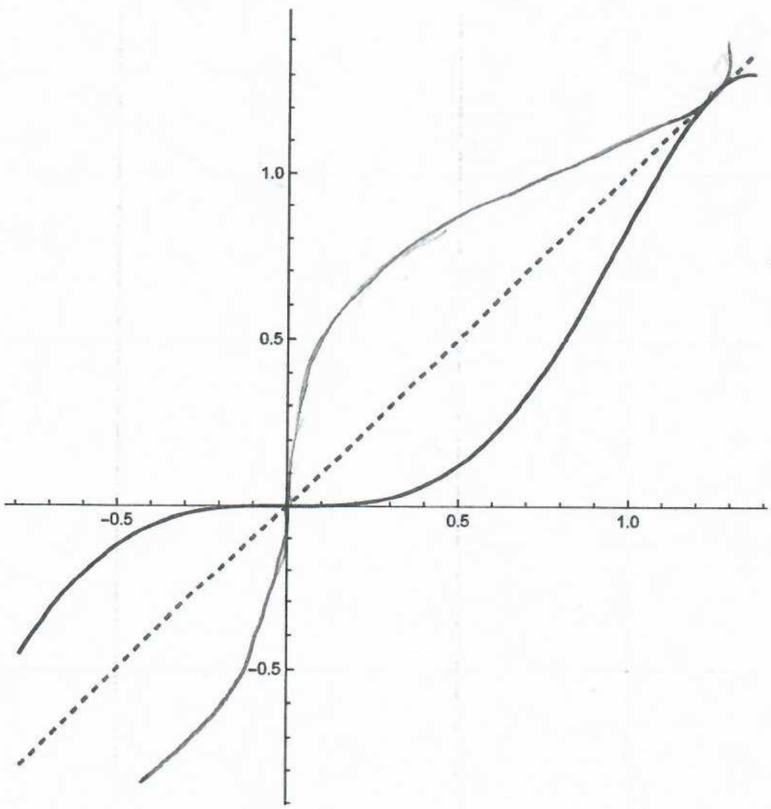
1. (4 pts) Why is $f(x) = x^4$ not invertible? Yet we need to be able to compute fourth roots, so how do we handle the situation?

It fails horizontal line test, so its inverse would fail the vertical line test. To combat this, we must restrict its domain.

2. (3 pts) Given the following function (given by the solid graph), draw the graph of the inverse function. **Draw carefully!**



3. (3 pts) It turns out that

$$g(x) = e^{3x-4}$$

is invertible. Find the derivative of the inverse of g (call the inverse $g^{-1}(x)$) by applying the rule

$$\frac{d}{dx}\left(g^{-1}(x)\right) = \frac{1}{g'(g^{-1}(x))}$$

$h(x) = e^x$

$I(x) = 3x-4$

$h'(x) = e^x$

$I'(x) = 3$

$g'(x) = 3e^{3x-4}$

$= 3g(x)$

$g^{-1}y = e^{3x-4}$

$\ln(y) = \ln(e^{3x-4}) =$

$\ln(y) = 3x-4$

$\frac{\ln(x)+4}{3} = g^{-1}(x)$

$g^{-1\prime}(x) = \frac{1}{3e^{3\left(\frac{\ln(x)+4}{3}\right)-4}}$

$g^{-1\prime}(x) = 3e^{\ln(x)}$

$g^{-1\prime}(x) = 3x$

close!

$\frac{1}{3e^{\ln(x)}}$

$\frac{1}{3x}$

Better to think

$$\left(g^{-1}(x)\right)' = \frac{1}{3g(g^{-1}(x))} = \frac{1}{3x}$$