

NAME: Solutions

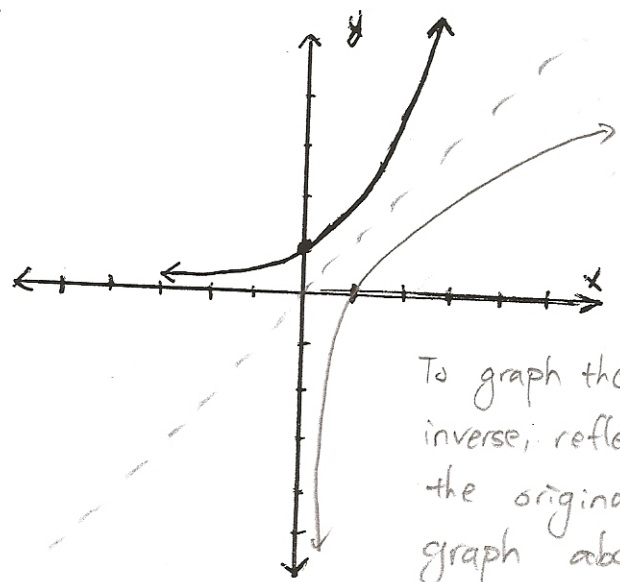
Section: _____

1. Determine which of the following have an inverse (Explain). Then sketch the inverse where there exist.

5pts

passes vertical line test: it is a function
 passes horizontal line test: it is one-to-one
 ⇒ invertible

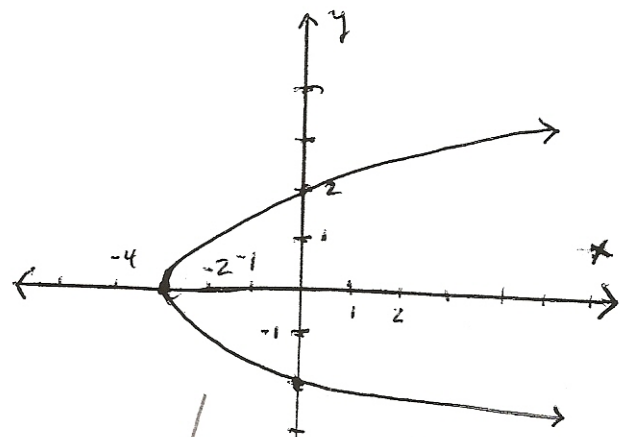
a.



To graph the inverse, reflect the original graph about the line $y=x$

(If you are curious: $f(x) = e^x$; $f^{-1}(x) = \ln(x)$)

b.



passes horizontal line test, but this result is meaningless

does not pass vertical line test: not a function ⇒ no inverse

2. Let $f(x) = \frac{1+3x}{5-2x}$, find $f^{-1}(x)$.

5pts

$$y = \frac{1+3x}{5-2x} \Leftrightarrow (5-2x)y = 1+3x \Leftrightarrow 5y - 2xy = 1+3x$$

$$\Leftrightarrow 5y - 1 = 2xy + 3x$$

Exchange x and $y \Rightarrow 5x - 1 = 2xy + 3y$

$$\Leftrightarrow 5x - 1 = y(2x + 3)$$

$$\Leftrightarrow y = \frac{5x - 1}{2x + 3}$$

$$\Rightarrow f^{-1}(x) = \frac{5x - 1}{2x + 3}$$