§5.3

1. (a) Fill in the table below.

$f(x)$	$\lvert f(x)\rvert$	$f\left(\lvert x\rvert\right)$
$x+2$		
x^2-4x		
x^3-3x^2		
$(x+1)^{-1}$		
$\sqrt{x+2}-3$		

$f(x)$	$\lvert f(x)\rvert$	$f\left(\lvert x\rvert\right)$
$x+2$	$\lvert x+2\rvert$	$\lvert x\rvert+2$
x^2-4x	$\lvert x^2-4x\rvert$	$\lvert x\rvert^2-3\lvert x\rvert = x^2-4\lvert x\rvert$
x^3-3x^2	$\lvert x^3-3x^2\rvert$	$\lvert x\rvert^3-3\lvert x\rvert^2 = \lvert x\rvert^3-3x^2$
$(x+1)^{-1}$	$\lvert(x+1)^{-1}\rvert$	$(\lvert x\rvert+1)^{-1}$
$\sqrt{x+2}-3$	$\lvert\sqrt{x+2}-3\rvert$	$\sqrt{\lvert x\rvert+2}-3$

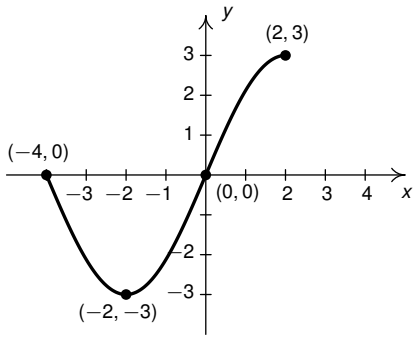
   (b) For each function f above, graph $y = f(x)$ and $y = \lvert f(x)\rvert$ using a graphing utility.

   - Write a sentence (or two!) explaining how to obtain the graph of $y = \lvert f(x)\rvert$ from $y = f(x)$.
     To obtain the graph of $y = \lvert f(x)\rvert$ from $y = f(x)$, reflect about the x-axis any portion of the graph of $y = f(x)$ which is below the x-axis.
   - How does your explanation relate to Definition **??**?
     If the graph is below the x-axis, then $f(x) < 0$. Since $\lvert f(x)\rvert = -f(x)$ if $f(x) < 0$, we are graphing $y = -f(x)$ for these values of x which is a reflection across the x-axis.

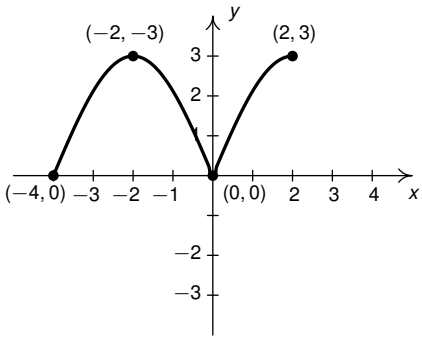
   (c) For each function f above, graph $y = f(x)$ and $y = f(\lvert x\rvert)$ using a graphing utility.

   - Write a sentence (or two!) explaining how to obtain the graph of $y = f(\lvert x\rvert)$ from $y = f(x)$.
     To obtain the graph of $y = f(\lvert x\rvert)$ from $y = f(x)$, replace the portion of the graph of $y = f(x)$ for $x \leq 0$ with the reflection about the y-axis of the portion of the graph of $y = f(x)$ for $x \geq 0$.
   - How does your explanation relate to Definition **??**?
     If $x < 0$, then $\lvert x\rvert = -x$, so $f(\lvert x\rvert) = f(-x)$. Since if $x < 0$, $-x > 0$, this means we reflect the graph of $y = f(x)$ about the y-axis for $x > 0$ only.

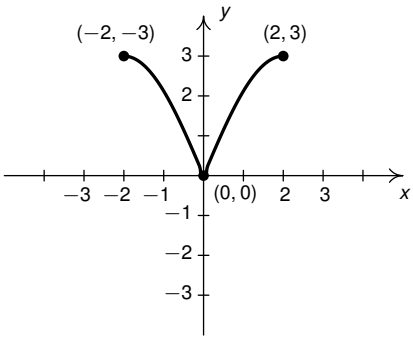
(d) Use the graph of $y = f(x)$ below to graph $y = |f(x)|$ and $y = f(|x|)$.



$y = f(x)$



$y = |f(x)|$



$y = f(|x|)$ - note the domain