Mathematics 1100Y – Calculus I: Calculus of one variable
TRENT UNIVERSITY, Summer 2012

Solutions to Assignment #2
Plot ~~for against~~ with `Maple`

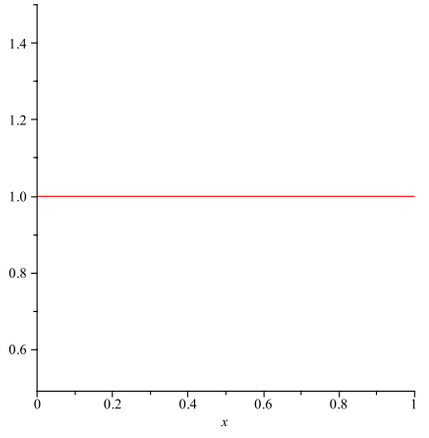
Before tackling this assignment, please at least skim through the handout *A very quick start with* `Maple` and Professor G.E. Urroz's *Getting started with Maple 10* (there's a link to it on the course web page), and play around with `Maple` a bit. You might also wish to consult `Maple`'s help for details on how to plot graphs of various sorts.

For questions **1** and **2** below please submit a printout of a Maple worksheet(s) as your solution.

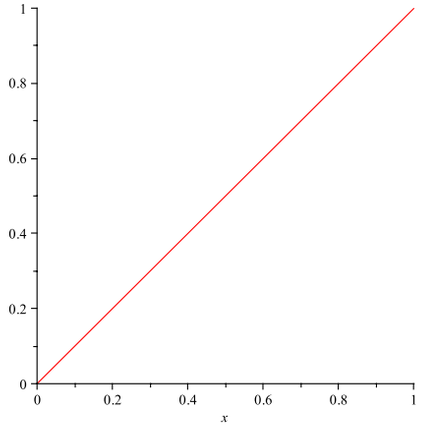
1. Use `Maple` to plot the graphs of $y = 1$, $y = x$, $y = \sqrt{x}$, and $y = \sqrt{1 - x^2}$, for $0 \leq x \leq 1$ in each case. *[4]*

SOLUTION. Here goes, in order:

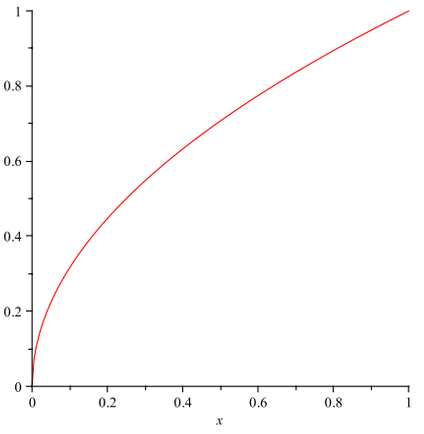
```
> plot(1,x=0..1)
```



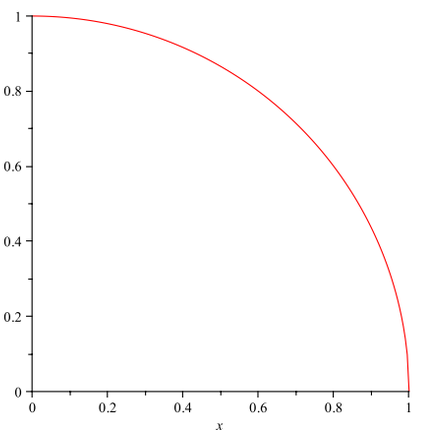

```
> plot(x,x=0..1)
```



```
> plot(sqrt(x),x=0..1)
```




```
> plot(sqrt(1-x^2),x=0..1)
```



The plots above were scaled down to save paper. ■

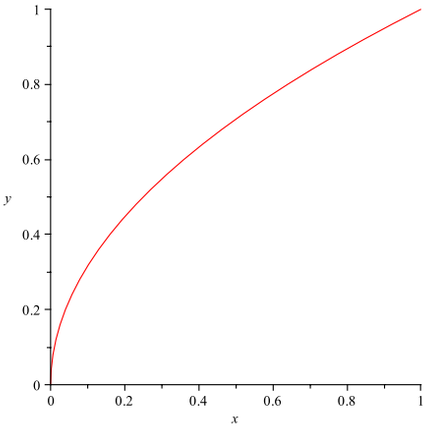
2. Use `Maple` to plot the curves given by the equations $x = y^2$, $x = |y|$, $x^2 + y^2 = 1$, and $xy = 1$, for $0 \leq x \leq 1$ and $0 \leq y \leq 1$ in each case. *[4]*

SOLUTION. And again, in order, though we first invoke the `plots` package to get access to the `implicitplot` command:

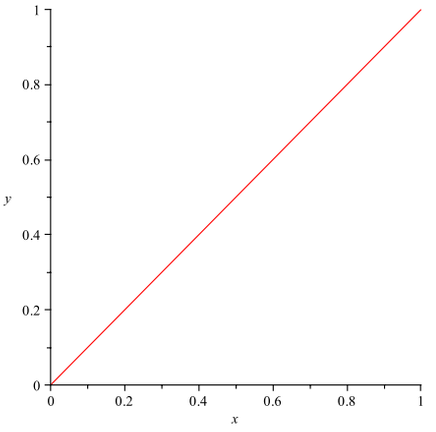
```
> with(plots);
```

[animate, animate3d, animatecurve, arrow, changecoords, complexplot, complexplot3d, conformal, conformal3d, contourplot, contourplot3d, coordplot, coordplot3d, densityplot, display, dualaxisplot, fieldplot, fieldplot3d, gradplot, gradplot3d, implicitplot, implicitplot3d, inequal, interactive, interactiveparams, intersectplot, listcontplot, listcontplot3d, listdensityplot, listplot, listplot3d, loglogplot, logplot, matrixplot, multiple, odeplot, pareto, plotcompare, pointplot, pointplot3d, polarplot, polygonplot, polygonplot3d, polyhedra_ supported, polyhedraplot, rootlocus, semilogplot, setcolors, setoptions, setoptions3d, spacecurve, sparsematrixplot, surfdata, textplot, textplot3d, tubeplot]

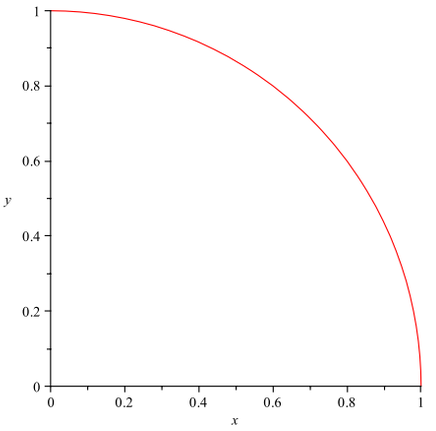
```
> implicitplot(x=y^2,x=0..1,y=0..1)
```



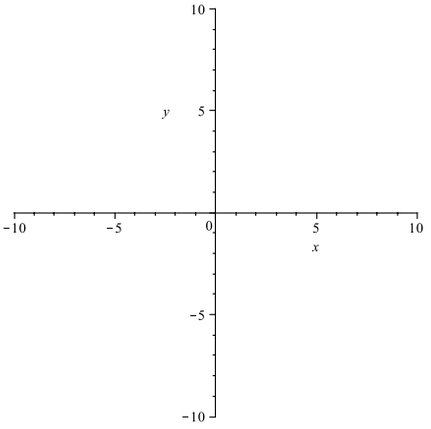

```
> implicitplot(y=|x|,x=0..1,y=0..1)
```




```
> implicitplot(x^2+y^2=1,x=0..1,y=0..1)
```



```
> implicitplot(x*y=1,x=0..1,y=0..1)
```



This last plot deserves a second glance. Why is apparently empty? (*Hint:* Just how much of the curve $xy = 1$ actually gets inside the square given by $0 \leq x \leq 1$ and $0 \leq y \leq 1$?) ■

3. Which of the curves you plotted in **1** and **2** are really the same? *[2]*

SOLUTION. There are three matches:

$y = x$ for $0 \leq x \leq 1$ is the same as $y = |x|$ for $0 \leq x \leq 1$ and $0 \leq y \leq 1$.

$y = \sqrt{x}$ for $0 \leq x \leq 1$ is the same as $x = y^2$ for $0 \leq x \leq 1$ and $0 \leq y \leq 1$.

$y = \sqrt{1 - x^2}$ for $0 \leq x \leq 1$ is the same as $x^2 + y^2 = 1$ for $0 \leq x \leq 1$ and $0 \leq y \leq 1$.

Note that without the specified restrictions on x and y, none of these would match. For example, $y = x$ and $y = |x|$ do not agree when $x < 0$. ■