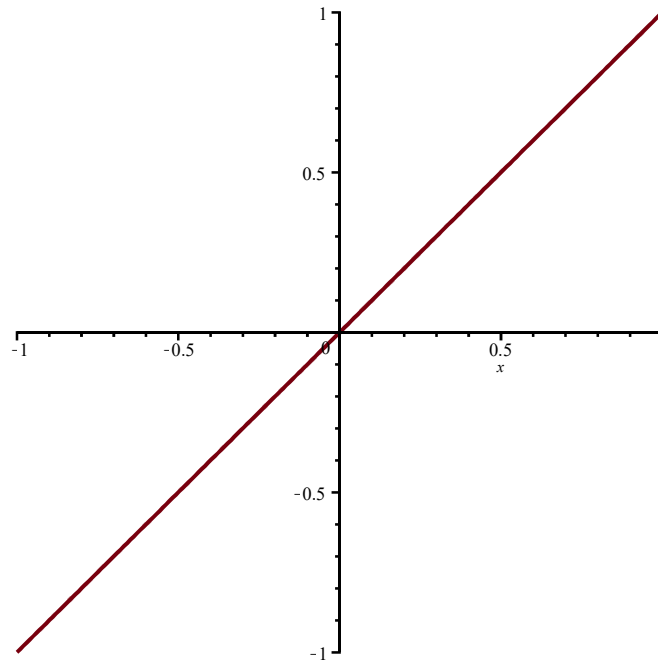
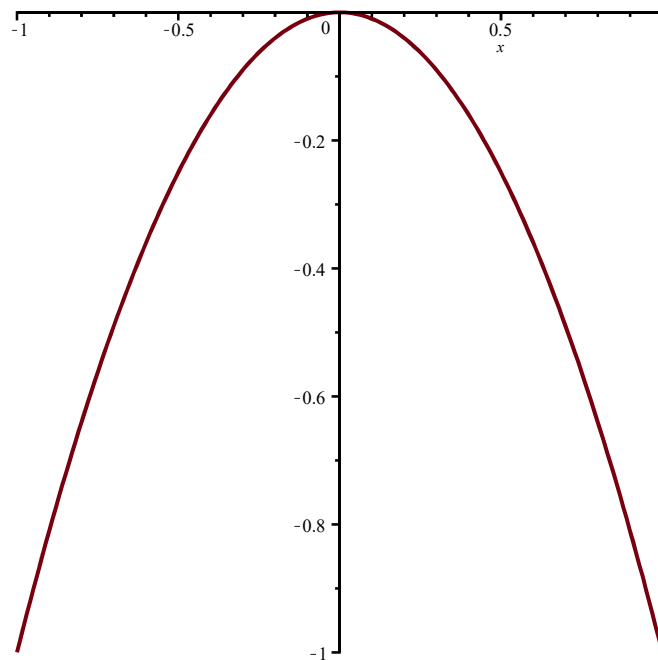


```
> Trent University, Winter 2021
> Solutions to Assignment #1
>
> 1(i)
> plot(x, x=-1..1)
```



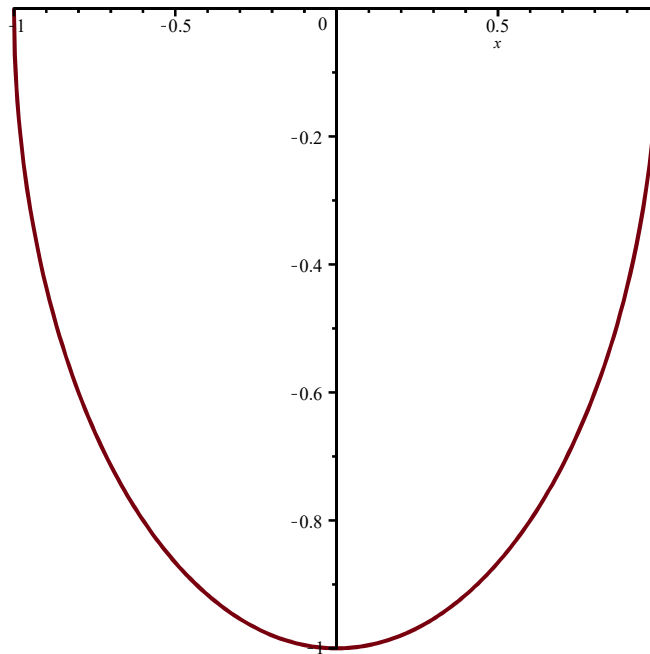
This is a straight line - a piece of  $y=x$  - from  $(-1,-1)$  to  $(1,1)$ .

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



This looks like (and is) a parabola opening downwards and with its tip at the origin.

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



This looks vaguely like a parabola, thanks to the distorted scale, but is actually the bottom half of the circle of radius 1 (i.e. the unit circle) centred at the origin.

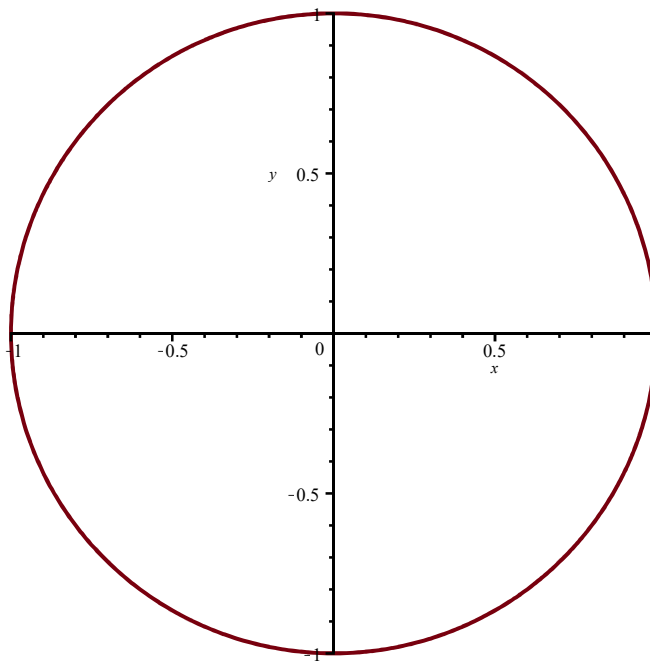
> *with(plots)*

[*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, shadebetween, spacecurve, sparsematrixplot, surfdata, textplot, textplot3d, tubeplot*]

(1)

> **2 (i)**

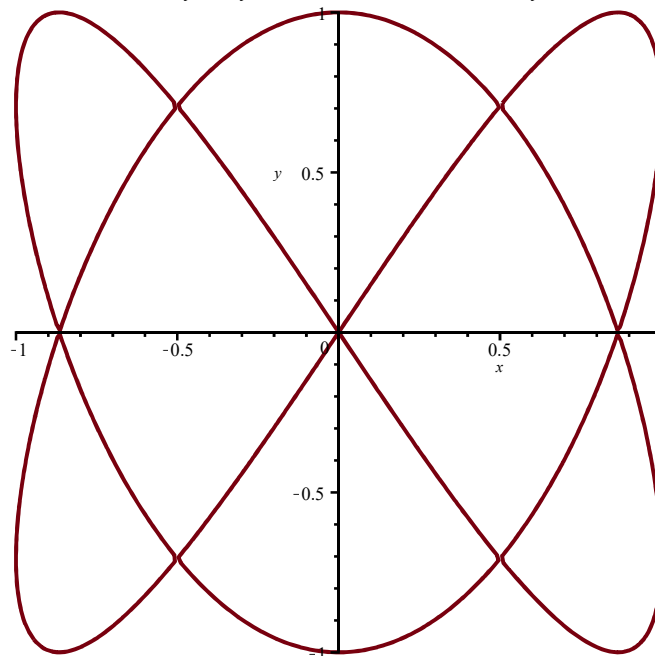
> *implicitplot*( $x^2 + y^2 = 1$ ,  $x = -1 .. 1$ ,  $y = -1 .. 1$ )



This looks like the circle of radius 1 (i.e. the unit circle) centred at the origin.

> **2 (ii)**

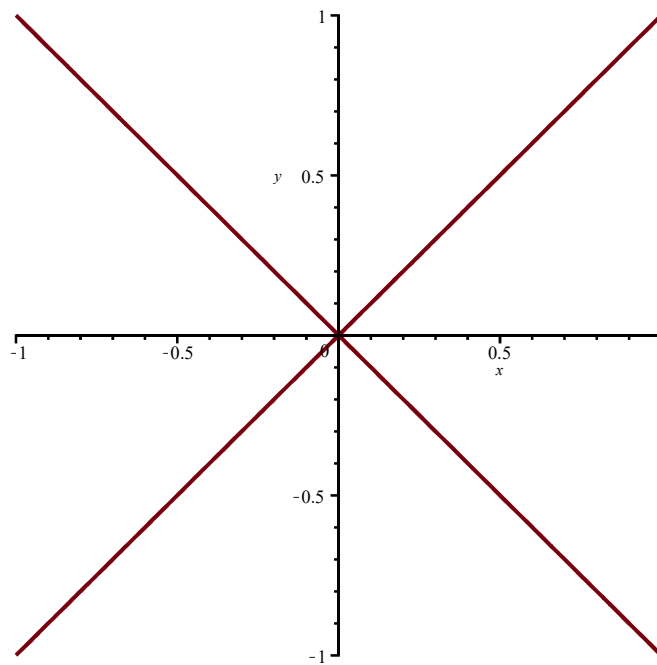
> `implicitplot(x2 · (4 · x2 - 3)2 + 4 · y2 · (y2 - 1) = 0, x = -5 .. 5, y = -5 .. 5)`



This looks like some kind of closed braid or knot.

> **2 (iii)**

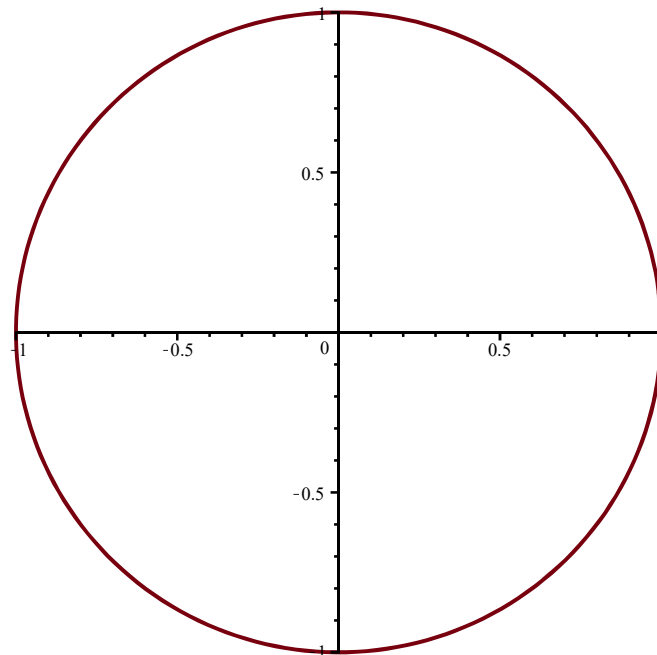
> `implicitplot(x2 = y2, x = -1 .. 1, y = -1 .. 1)`



This looks like the two straight lines  $y=x$  and  $y=-x$  between  $x=-1$  and  $x=1$ .

> **3(i)**

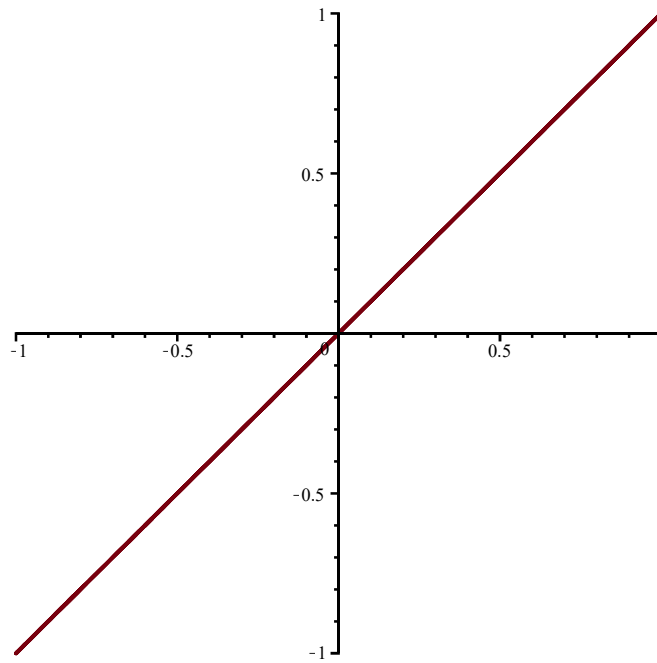
> `plot([cos(t), sin(t), t=0..2·Pi])`



This looks like the unit circle centred at the origin.

> **3(ii)**

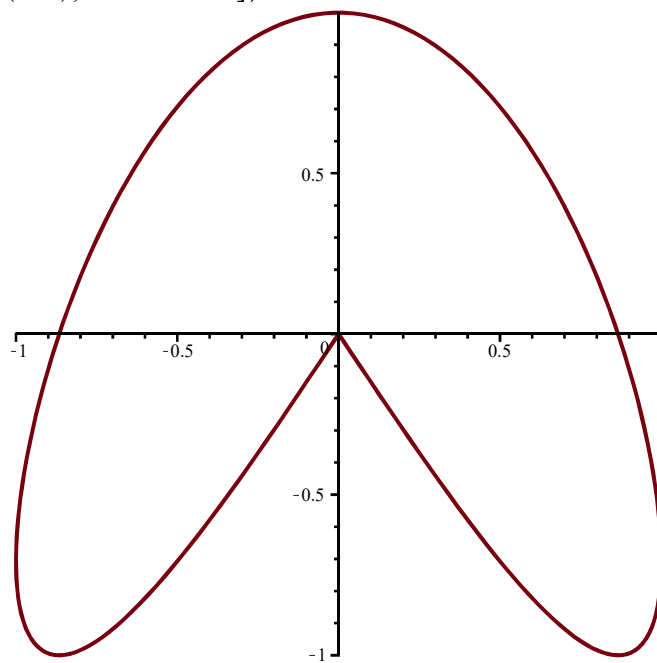
> `plot([sin(t), sin(t), t=0..2·Pi])`



This is a straight line from (-1,-1) to (1,1).

> **3 (iii)**

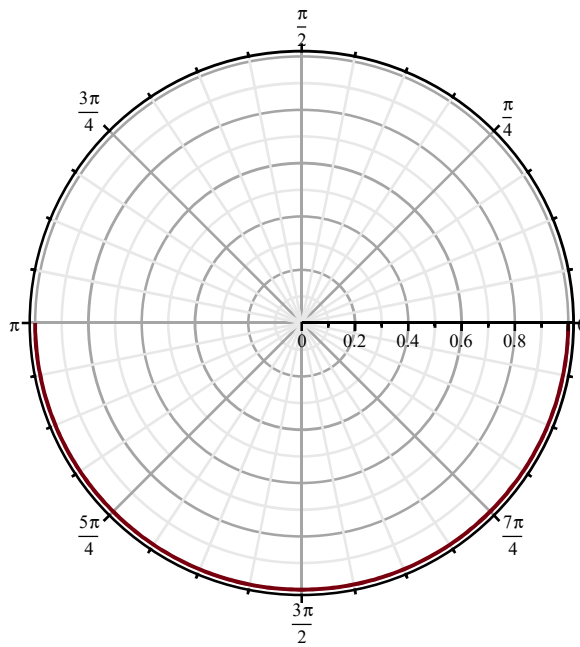
> `plot([sin(2*t), sin(3*t), t = Pi .. 2*Pi])`



This curve looks vaguely like a boomerang or an upside-down heart shape.

> **4 (i)**

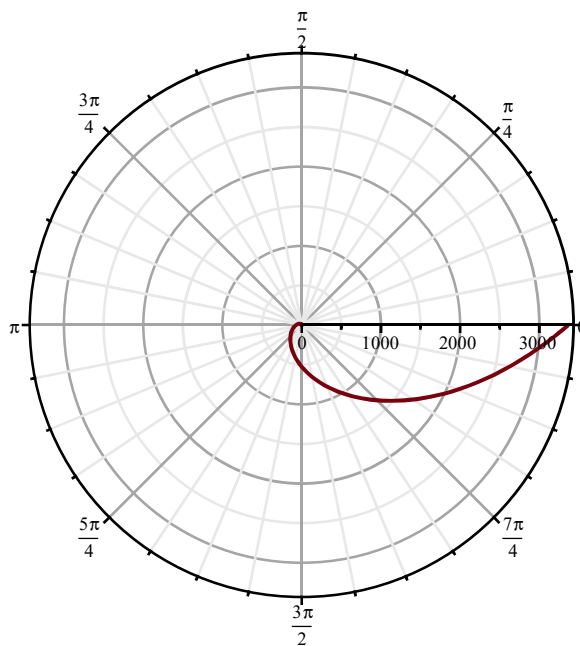
> `polarplot(1, theta = Pi .. 2*Pi)`



This curve is the bottom half of the circle centred at the origin.

> **4 (ii)**

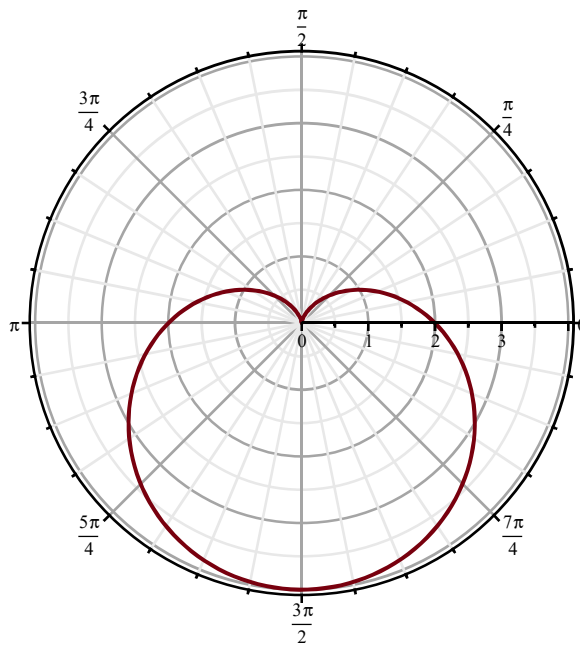
> `polarplot(theta·exp(theta), theta = -2·Pi ..2·Pi)`



This curve looks like a spiral starting at or near the origin.

> **4 (iii)**

> `polarplot(2 - 2·sin(theta), theta = 0 ..2·Pi)`



*This curve looks vaguely heart – shaped.*

> **5.**

- a. Both 1(i) and 3(ii) are the straight line segment joining the points  $(-1,-1)$  and  $(1,1)$ , and this straight line segment is one of the two line segments crossing at the origin in 2(iii).
- b. Both 1(iii) and 4(i) are the bottom half of the unit circle centred at the origin, and the entire circle is the curve in 2(i).

That's it this time around...

> **...so this is the end.**