Problem 8.1

```
> 1+3+4+2;
```

$$10 \tag{1}$$

Problem 8.2

```
> with(LinearAlgebra):
> A:=Matrix([
  [3, 0.1, 0.2, 0.2],
  [0.1, 3*I, 0.2, 0.2],
  [0,0.1,0.4,0.1],
  [0.1, 0.2, 0.2, 1]
  ]);
```

$$A := \begin{bmatrix} 3 & 0.1 & 0.2 & 0.2 \\ 0.1 & 3\,I & 0.2 & 0.2 \\ 0 & 0.1 & 0.4 & 0.1 \\ 0.1 & 0.2 & 0.2 & 1 \end{bmatrix} \tag{2}$$

```
> Norm(A);#default norm is the infinity norm
  Norm(A,infinity);
```

$$3.5$$
$$3.5 \tag{3}$$

```
> Norm(A,2);
```

$$3.108855598 \tag{4}$$

```
> Norm(A,1);
```

$$3.40000000000000036 \tag{5}$$

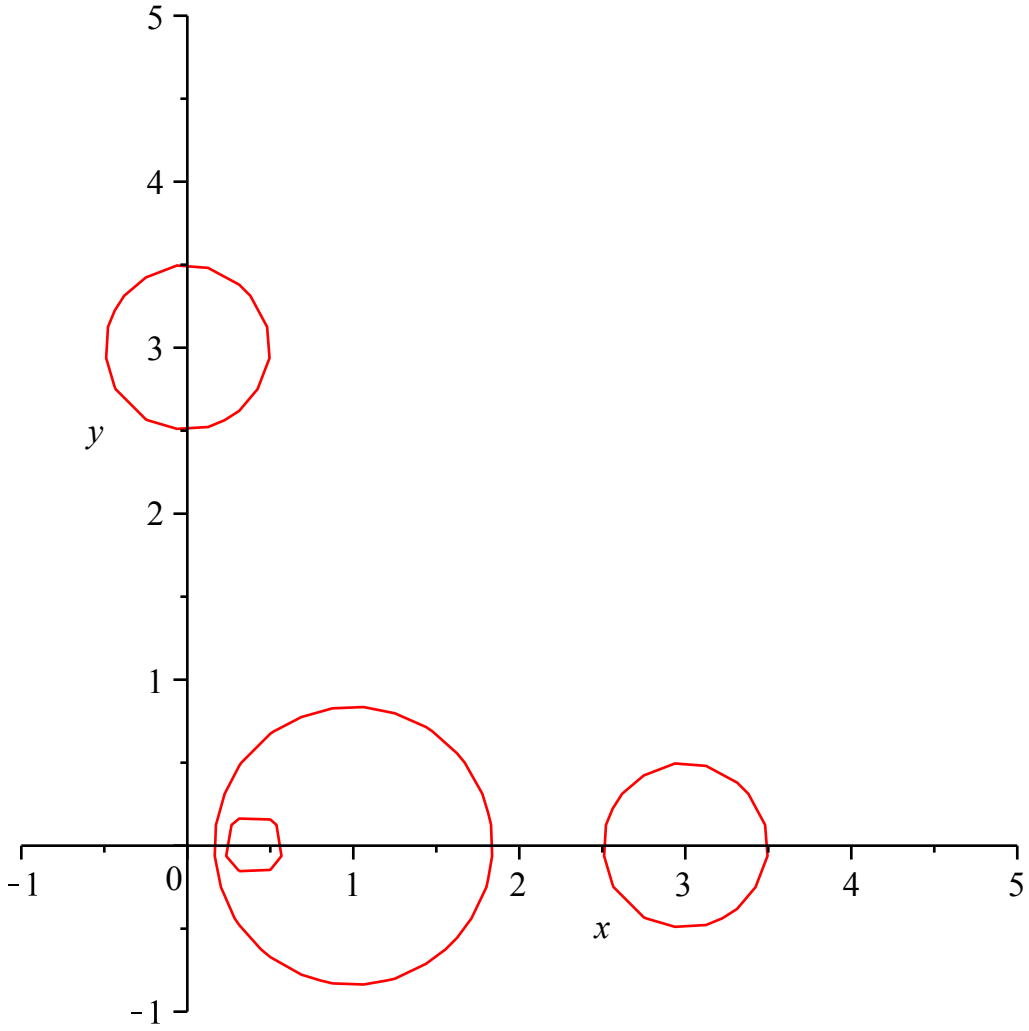
```
> Norm(Transpose(A),1);
```

$$3.50000000000000044 \tag{6}$$

```
> 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*] (7)

```
> implicitplot({(x-3)^2+y^2-0.5^2,x^2+(y-3)^2-0.5^2,(x-0.4)^2+y^2-0.2^2,(x-1)
  ^2+y^2-sqrt(0.5)},x=-1..5,y=-1..5,scaling=constrained,view=[-1..5, -1.
  .5],numpoints=1000);
```



It is invertible since (0,0) is inside none of the Gersshorin circles.

```
> with(LinearAlgebra):
> Eigenvalues(A);#note where the actual eigenvalues are!
```

$$\begin{bmatrix} 3.01273481809502 + 0.00237511753815189\,I \\ -0.00761576760561380 + 2.98065111609742\,I \\ 1.02532699207498 + 0.0141384654248454\,I \\ 0.369553957435615 + 0.00283530093958180\,I \end{bmatrix} \quad \textbf{(8)}$$

Probem 8.3

```
> 1;
```

1 **(9)**