```
## APM120 HW-00
import       as
from       import
import       as
import                    as
from      import

## Plot $f(x)=\cos(3x)$ vs $x$ for $x=(-2\pi,\pi)$:
             2       0 1
         3
           1

# always label axes and provide titles:
           'x'
           'f'
         'f(x)=cos(3x)'


## Solve a linear equations $Ax=b$:
                 8  2  7    4  2  2    6  7  0
            3  4  1
print 'determinant of A:'
print
print 'solution using matrix inverse is:'
                                  print "x2=np.linalg.inv(A)="   print
print 'checking that x is a solution; A*x2:'
print
print 'b:'
print

## Calculate the eigenvalues and vectors of $A$:
print 'eigenvectors/ values of A:\n'

print "V="   print    print "D="   print

# Reminder: MATLAB indexes from 1, Python from 0.
## verify that V_1 is an eigenvector of A
print 'A*v1:\n'
print                  0
print 'lambda1*v1:\n'
print   0 0      0

## verify that V_2 is an eigenvector of A
print 'A*v2:\n'
print                  1
print 'lambda2*v2:\n'
print   1 1      1

## Calculate the eigenvalues and vectors of $B$:
                1 3j  8 10j 0 3j    7 3j  4 9j  3 2j   11 3j  16 12j 6 5j
print 'eigenvectors/ values of A:\n'

print "V="   print    print "D="   print

# Reminder: MATLAB indexes from 1, Python from 0.
## verify that V_1 is an eigenvector of A
print 'A*v1:\n'
print                  0
print 'lambda1*v1:\n'
print   0 0      0

## verify that V_2 is an eigenvector of A
print 'A*v2:\n'
print                  1
```

```
print 'lambda2*v2:\n'
print   1 1      1
```