

Lab 0

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Question 1

```
ax=0:9
```

```
ax =  
    0     1     2     3     4     5     6     7     8     9
```

```
bx=[10.9 11.8 12.7 13.6 14.5 15.4 16.3 17.2 18.1 19.0]
```

```
bx =  
    10.9000    11.8000    12.7000    13.6000    14.5000    15.4000    16.3000    17.2000 ...
```

```
cx=[-5 0 5 3 0 -3 -1 0 1 0]
```

```
cx =  
    -5     0     5     3     0    -3    -1     0     1     0
```

```
ay=1:150
```

```
ay =  
     1     2     3     4     5     6     7     8     9    10    11    12    13 ...
```

```
by=1:.75:150
```

```
by =  
     1.0000     1.7500     2.5000     3.2500     4.0000     4.7500     5.5000     6.2500 ...
```

```
pix=ax.*3.1415
```

```
pix =  
     0     3.1415     6.2830     9.4245    12.5660    15.7075    18.8490    21.9905 ...
```

```
abx=ax.*bx
```

```
abx =  
     0    11.8000    25.4000    40.8000    58.0000    77.0000    97.8000   120.4000 ...
```

```
acx=ax+cx
```

```
acx =  
    -5     1     7     6     4     2     5     7     9     9
```

```
ababx=abx.*abx
```

```
ababx =
```

```
1.0e+04 * ...
0      0.0139      0.0645      0.1665      0.3364      0.5929      0.9565      1.4496
```

```
byrt=sqrt(by)
```

```
byrt =
1.0000      1.3229      1.5811      1.8028      2.0000      2.1794      2.3452      2.5000 ...
```

Question 2

```
M=csvread('lab0.csv',1)
```

```
M =
    2500         3
    5000         3
    7500         1
   10000         3
   12500         7
   15000         5
   17500         4
   20000         1
   22500         4
   25000        11
      ⋮
```

```
h1=M(:,1)
```

```
h1 =
    2500
    5000
    7500
   10000
   12500
   15000
   17500
   20000
   22500
   25000
      ⋮
```

```
h2=0.3048*h1
```

```
h2 =
    762
   1524
   2286
   3048
   3810
   4572
   5334
   6096
   6858
   7620
      ⋮
```

```
r1=M(:,2)
```

```
r1 =  
    3  
    3  
    1  
    3  
    7  
    5  
    4  
    1  
    4  
   11  
    .  
    .
```

```
rlerr=sqrt(r1)
```

```
rlerr =  
    1.7321  
    1.7321  
    1.0000  
    1.7321  
    2.6458  
    2.2361  
    2.0000  
    1.0000  
    2.0000  
    3.3166  
    .  
    .
```

```
r2=1./r1
```

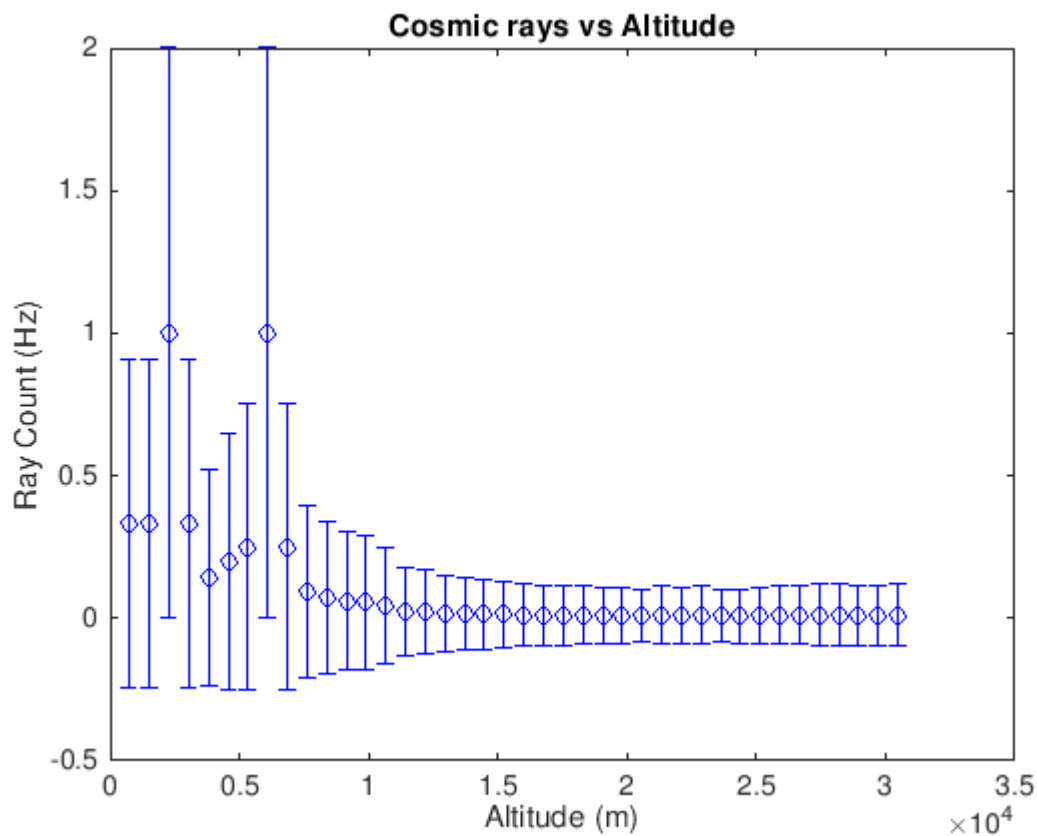
```
r2 =  
    0.3333  
    0.3333  
    1.0000  
    0.3333  
    0.1429  
    0.2000  
    0.2500  
    1.0000  
    0.2500  
    0.0909  
    .  
    .
```

```
r2err=sqrt(r2)
```

```
r2err =  
    0.5774  
    0.5774  
    1.0000  
    0.5774  
    0.3780  
    0.4472  
    0.5000  
    1.0000
```

```
0.5000
0.3015
⋮
```

```
errorbar(h2, r2, r2err, 'bo')
xlabel('Altitude (m)')
ylabel('Ray Count (Hz)')
title('Cosmic rays vs Altitude')
```



Question 3

```
mm=[7 4 2; -1 5 5; 2 3 -9]
```

```
mm =
     7     4     2
    -1     5     5
     2     3    -9
```

```
mminv=inv(mm)
```

```
mminv =
    0.1357   -0.0950   -0.0226
   -0.0023    0.1516    0.0837
    0.0294    0.0294   -0.0882
```

Matrices are inverses if their product is the identity matrix, which is the case here

```
mminv*mm
```

```
ans =  
    1.0000    -0.0000    -0.0000  
         0     1.0000     0.0000  
   -0.0000     0.0000     1.0000
```

Question 4

$$\sigma_f^2 = \frac{\sigma_x^2 a^2}{x^2} + \frac{\sigma_y^2 b^2}{y^2}$$

$$m_z = \frac{2qRB}{c}$$

$$X^2 = \sum_i \frac{(x_i - \bar{x})^2}{\sigma_i^2}$$