

# Παραδείγματα σε Matlab/ Octave

# Πίνακας τιμών $\sin(x)$

```
n = 21;  
x = linspace(0,1,n);  
y = sin(2*pi*x);  
disp(' ')  
disp(' k   x(k)  sin(x(k))')  
disp('-----')  
for k=1:21  
    degrees = (k-1)*360/(n-1);  
    disp(sprintf(' %2.0f   %3.0f   %6.3f   ',k,degrees,y(k)));  
end  
disp(' ');  
disp('x(k) is given in degrees.')  
disp(sprintf('One Degree = %5.3e Radians',pi/180))
```

1	0	0.000
2	18	0.309
3	36	0.588
4	54	0.809
5	72	0.951
6	90	1.000
7	108	0.951
8	126	0.809
9	144	0.588
10	162	0.309
11	180	0.000
12	198	-0.309

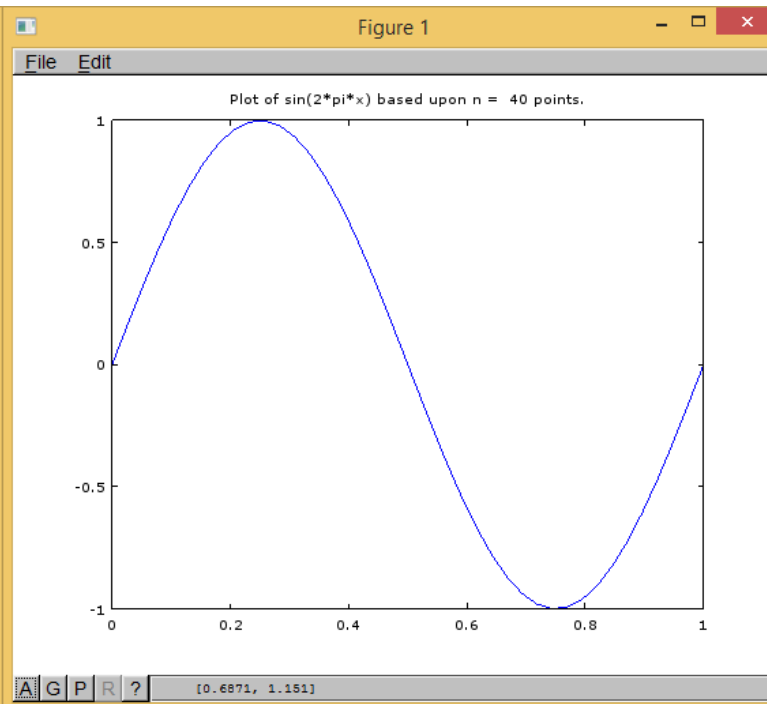
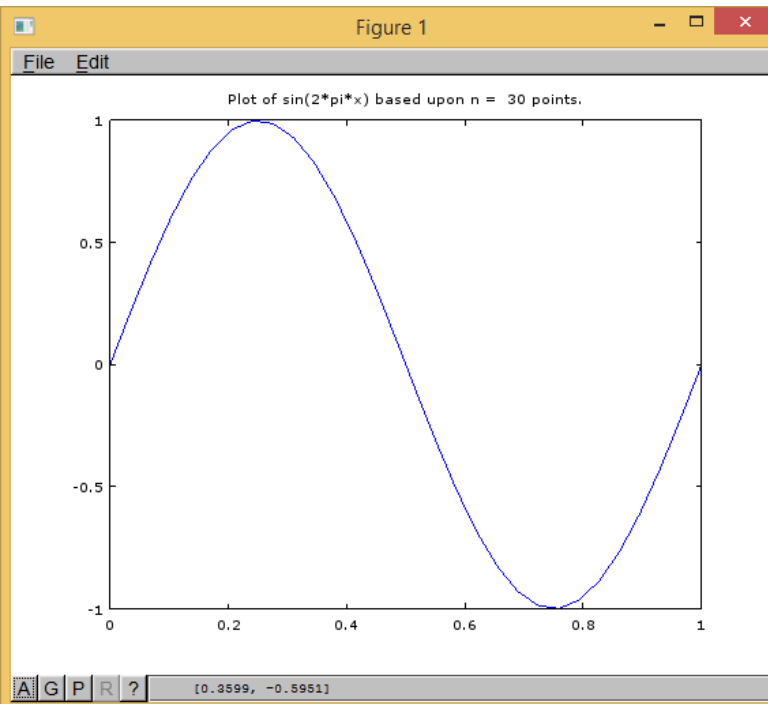
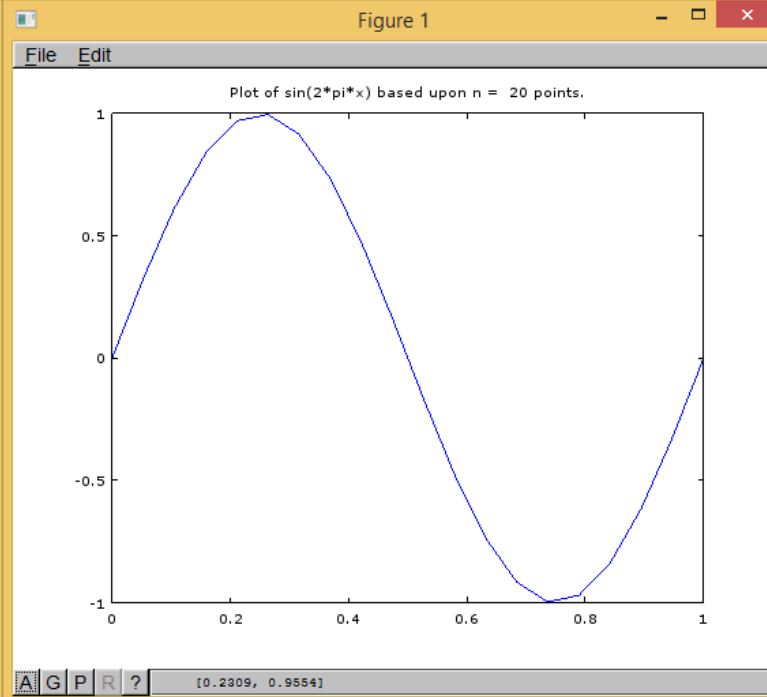
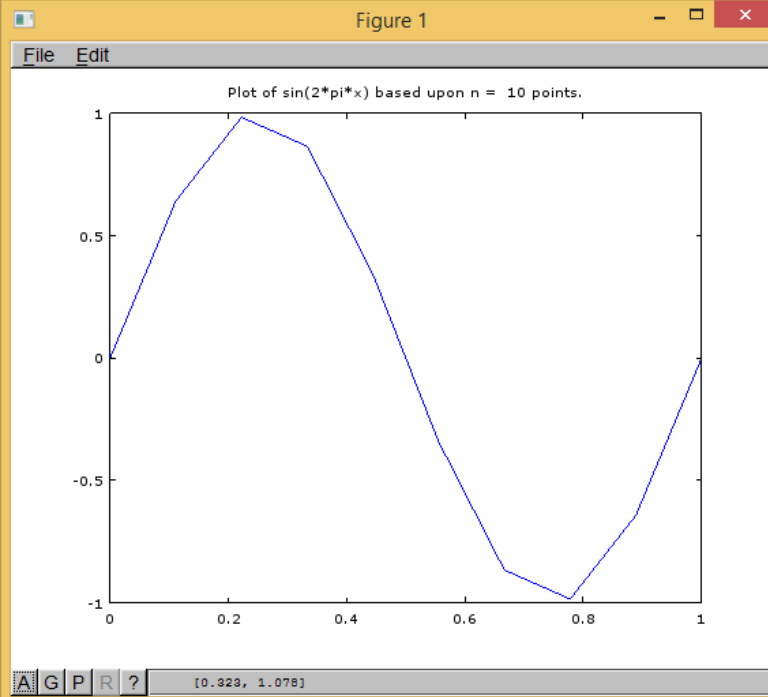
13	216	-0.588
14	234	-0.809
15	252	-0.951
16	270	-1.000
17	288	-0.951
18	306	-0.809
19	324	-0.588
20	342	-0.309
21	360	-0.000

x(k) is given in degrees.

One Degree = 1.745e-002 Radians

# Γραφική Παράσταση

```
for n = [10 20 30 40]
    x = linspace(0,1,n);
    y = sin(2*pi*x);
    plot(x,y)
    title(sprintf('Plot of sin(2*pi*x) based upon n = %3.0f points.',n))
    pause(1)
end
```



$$f(x) = 2\sin(x) + 3\sin(2x) + 7\sin(3x) + 5\sin(4x)$$

```
x = linspace(-10,10,200)';
```

```
A = [sin(x) sin(2*x) sin(3*x) sin(4*x)];
```

```
y = A*[2;3;7;5];
```

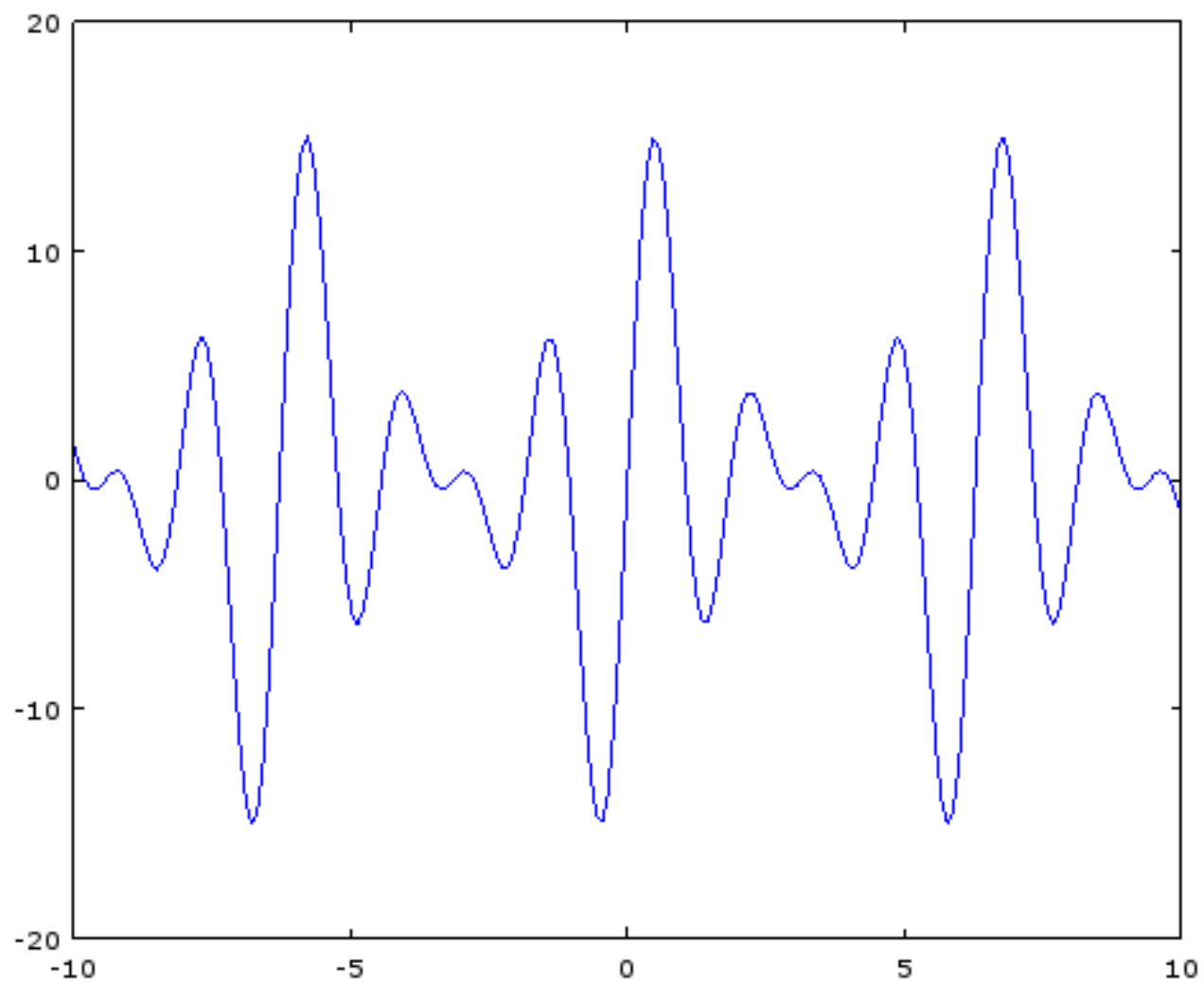
```
plot(x,y)
```

```
title('f(x) = 2sin(x) + 3sin(2x) + 7sin(3x) + 5sin(4x)')
```

Figure 1

File Edit

$$f(x) = 2\sin(x) + 3\sin(2x) + 7\sin(3x) + 5\sin(4x)$$



A G P R ?

[-7.041, 19.44]

$$f(x) = 2\sin(x) + 3\sin(2x) + 7\sin(3x) + 5\sin(4x)$$

$$g(x) = 8\sin(x) + 2\sin(2x) + 6\sin(3x) + 9\sin(4x)$$

n = 200;

x = linspace(-10,10,n)';

A = [sin(x) sin(2\*x) sin(3\*x) sin(4\*x)];

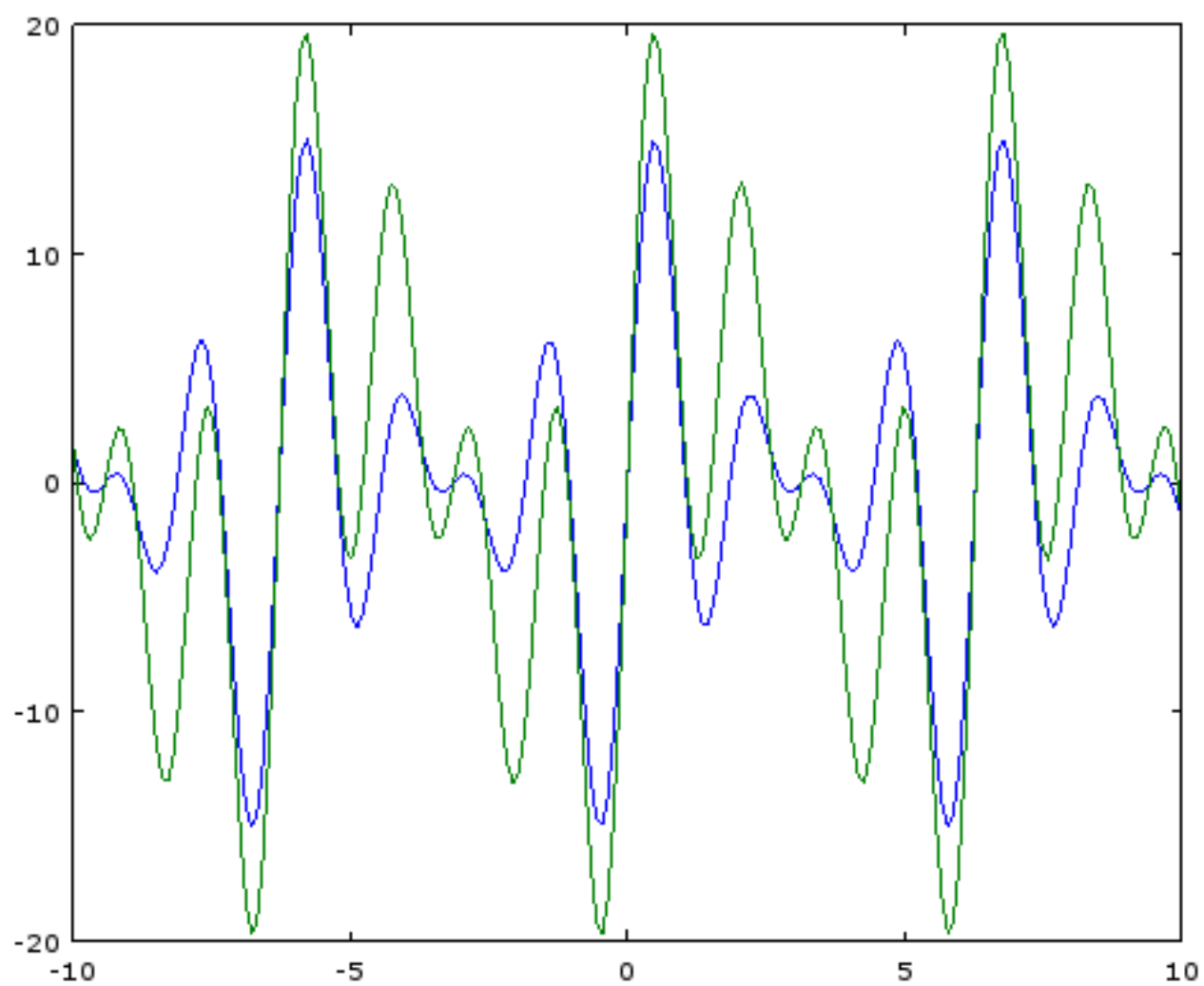
y = A\*[2 8;3 2;7 6;5 9];

plot(x,y)



Figure 1

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A G P R ?

[-6.95, 20]

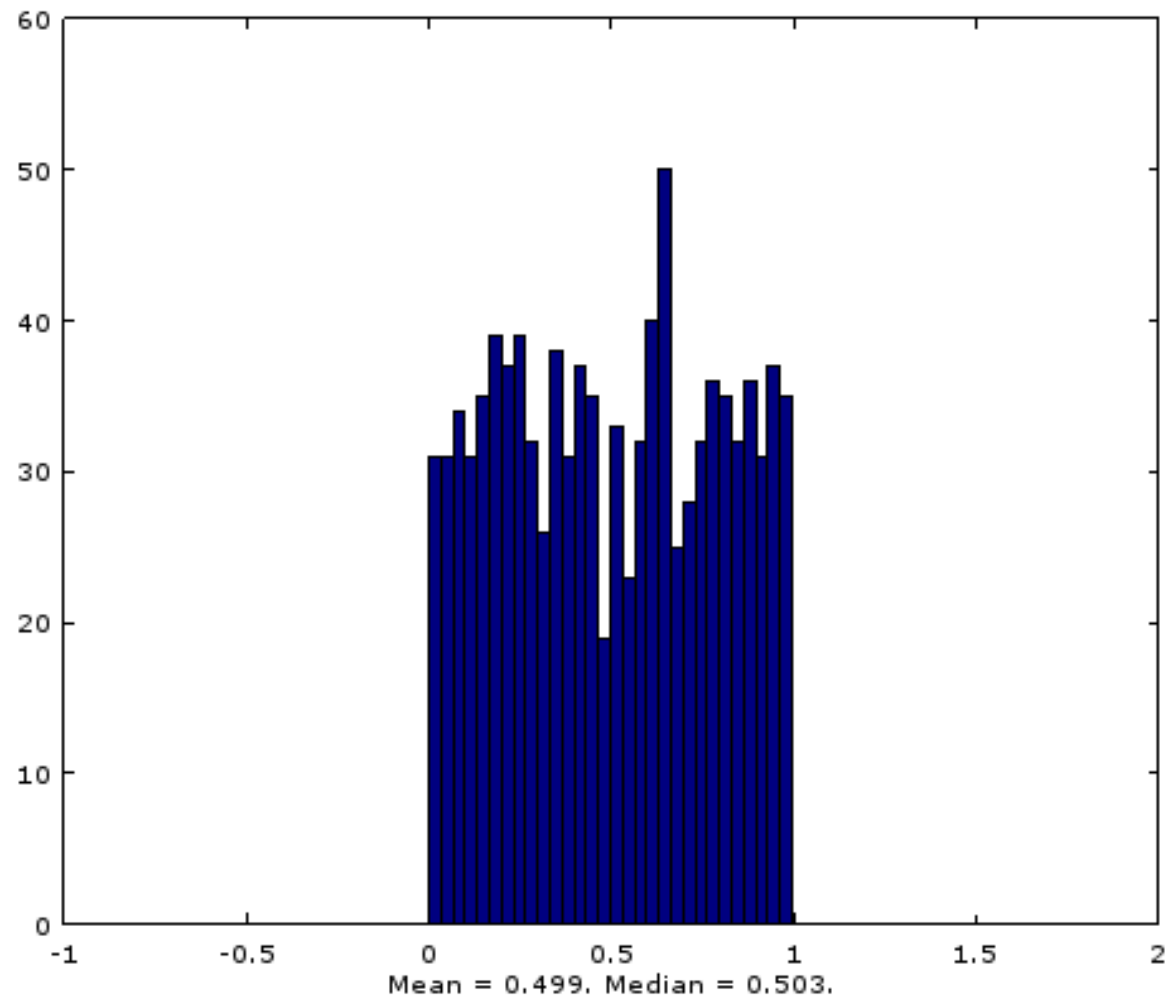
# Ιστόγραμμα

```
x = rand(1000,1);  
hist(x,30)  
axis([-1 2 0 60])  
title('Distribution of Values in rand(1000,1)')  
xlabel(sprintf('Mean = %5.3f. Median = %5.3f.',mean(x),median(x)))
```

Figure 1

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Distribution of Values in rand(1000,1)



A G P R ?

[-0.729, 56.49]

# Άθροισμα 2 ζαριών

```
First = 1 + floor(6*rand(1000,1));
```

```
Second = 1 + floor(6*rand(1000,1));
```

```
Throws = First + Second;
```

```
hist(Throws, linspace(2,12,11));
```

```
title('Outcome of 1000 Dice Rolls.')
```

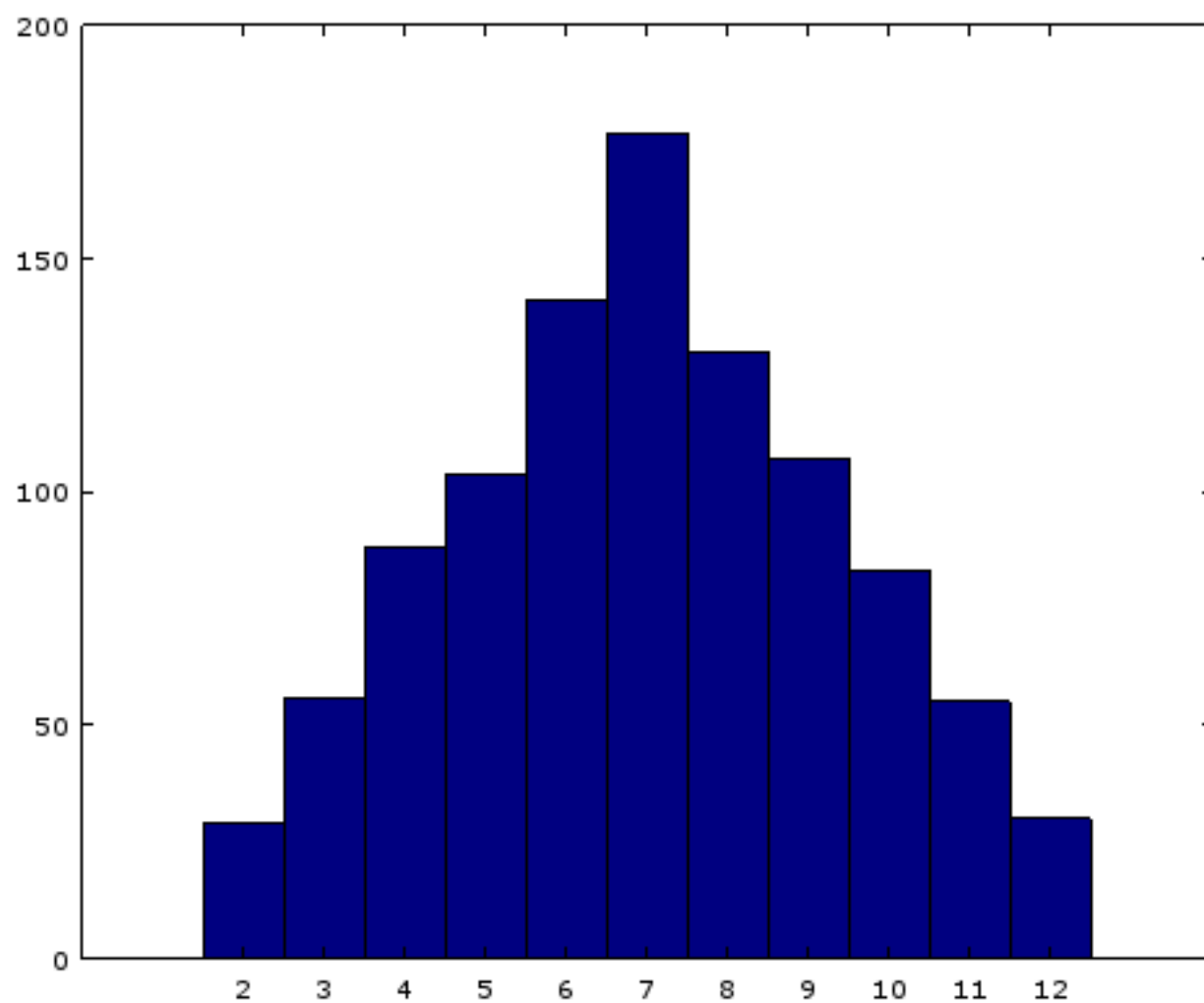


Figure 1



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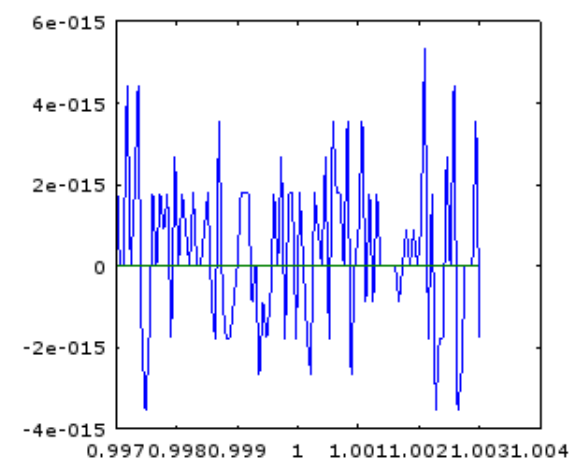
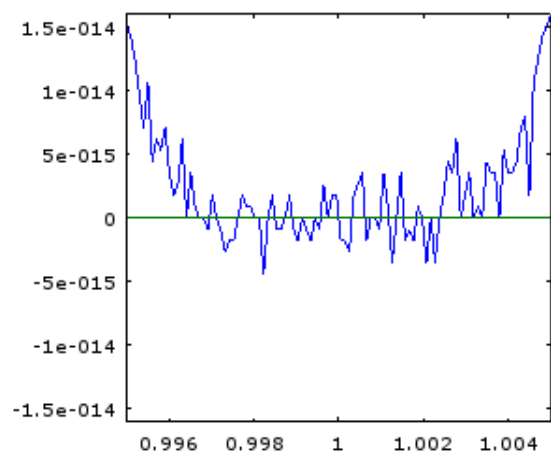
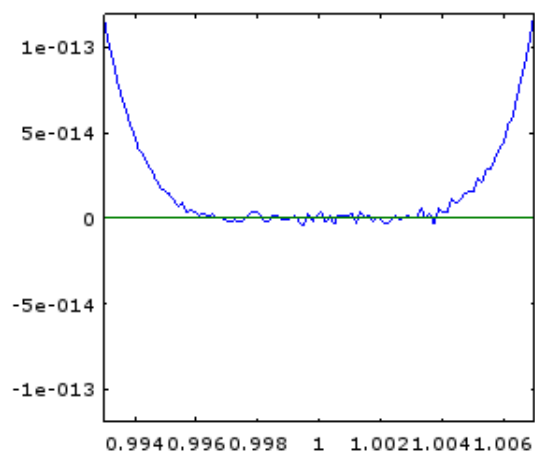
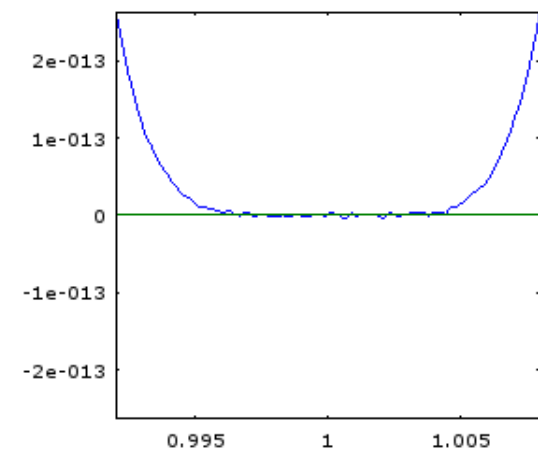
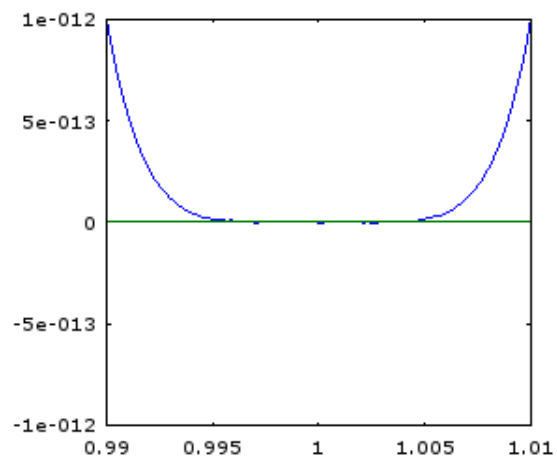
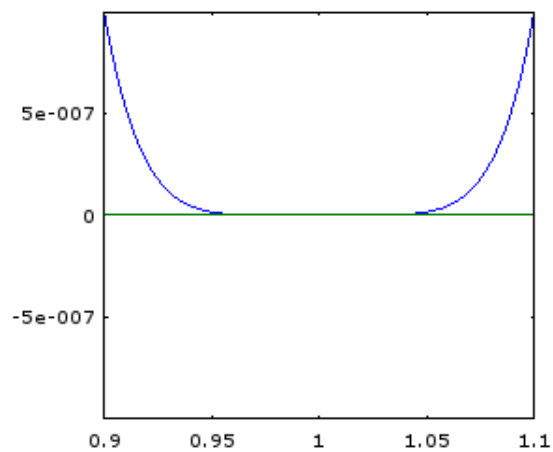
Outcome of 1000 Dice Rolls.



A G P R ?

# Γραφική Παράσταση $(x-1)^6$ κοντά στο $x=1$

```
k=0;
n=100;
for delta = [.1 .01 .008 .007 .005 .003 ]
    x = linspace(1-delta,1+delta,n)';
    y = x.^6 - 6*x.^5 + 15*x.^4 - 20*x.^3 + 15*x.^2 - 6*x + ones(n,1);
    k = k+1;
    subplot(2,3,k)
    plot(x,y,x,zeros(1,n))
    axis([1-delta 1+delta -max(abs(y)) max(abs(y))])
end
```



Σχετικό σφάλμα Taylor προσέγγιση του  $e^x$  μέσω  
 $1 + x + \frac{x^2}{2!} + \dots + \frac{x^n}{n!}$

```
nTerms = 50;
for x=[5 1]
    figure
    f = exp(x)*ones(nTerms,1);
    s = 1;
    term = 1;
    for k=1:50
        term = x.*term/k;
        s = s+ term;
        err(k) = abs(f(k) - s);
    end
    relerr = err/exp(x);
    semilogy(1:nTerms,relerr)
    ylabel('Relative Error in Partial Sum.')
    xlabel('Order of Partial Sum.')
    title(sprintf('x = %5.2f',x))
end
```



