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Example Sheet 1
Getting to know `Matlab`

Using examples from the lectures, try the following problems. They are not compulsory. If you like any help or comments, please email *your code and question* to Polina Vytnova (P.Vytnova@warwick.ac.uk). I am happy to help when you get stuck and nothing comes to mind after some thinking.

Q1. (a) Given a matrix A how would you find a product of all its elements?

(b) Calculate $n!$ for $n = 10, 20$

Q2. Find the sum of cubes of all prime numbers from 1 to 1000. Hint: read `help isprime`.

Q3. Read `help plot` and `help cumsum`. Plot the graph of the function $f(n) = \sum\limits_{j=1}^{n} \frac{1}{j^2} - \frac{\pi^2}{6}$ on the interval $[1; 30]$.

4**. Find the last 100 digits and the first 100 digits of 100!. *Warning: this question is very hard!*

Q5. (a) Calculate the sum of binomial coefficients $\sum\limits_{k=1}^{n} \binom{n}{k}$ for $n = 10$. Verify it is 1024.

(b) Plot the function $f_n(k) = \frac{1}{2^k} \binom{n}{k}$ for $n = 30, 50, 100$. (Use `hold on` to plot all of them on the same picture). This is the density of binomial distribution, it is important in probability theory. Hint: you can apply `factorial` function to matrices: analyse

```
factorial(k)./(factorial([0:k]).*factorial(k-[0:k]))
```