Lab-Project 1 MATLAB-Exercise

a) **Linear equations with parameters:**

(a) Write a `function`, which solves the linear set of equations

$$\begin{aligned} 5x_1 + 2rx_2 + rx_3 &= 2 \\ 3x_1 + 6x_2 + (2r-1)x_3 &= 3 \\ 2x_1 + (r-1)x_2 + 3rx_3 &= 5 \end{aligned}$$

in a matrix-vector form for single values of the parameter r, including calculation of the determinant of the coefficient matrix.

(b) Test the function from the `command window`.

(c) Write a script for the following tasks:

i. call the `function` for different parameter-values $r \in [-1, 1]$,

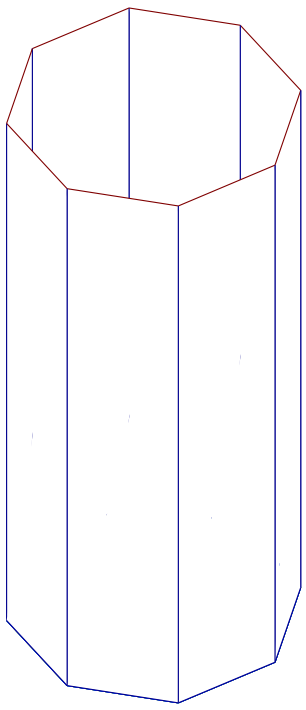
ii. store the results in a matrix (linear equation solution) / vector (determinant),

iii. plot the results (including determinant) against r in one figure.

b) **Regular prism:**

Write a `function` for the calculation and plot of an n-sided regular (right) prism (solid figure with plane faces):

- its base is bounded by any congruent polygons (sides and angles are equal)
- its lateral faces are bounded by rectangles



parameters:

n	number of sides of base polygons > 2
R	radius of circum circle of base polygons
h	height of prism

necessary formulas:

α	$=$	$2\pi/n$	polygon angle
a	$=$	$2R\sin(\alpha/2)$	polygon side length
S_p	$=$	$0.5nR^2\sin(\alpha)$	polygon area
S	$=$	$2S_p + nah$	prism surface
V	$=$	$S_p h$	prism volume