1. funksiyaning -π ≤ *x* ≤ π va -π ≤ *y* ≤ π sohalardagi 3D sirt grafigini tuzing. **(10 ball)**
2. funksiyani -4 ≤ *x* ≤ 4 sohadagi grafigini chizing. Funksiya ikkita nuqtada vertikal asimptotaga ega ekanligini unutmang (*x1* = -1 va *x2* = 1 da). Funksiya grafigini, x o'zgaruvchisining diapazonini uch qismga bo'lish orqali chizing: birinchisi -4 dan chap asimptotagacha, ikkinchi qismi ushbu ikki asimptota o'rtasida va uchinchisi o'ng asimptotadan 4 gacha. Y o’qi diapazonini -15 dan 15 gacha o’rnating. O’qlarni belgilang va grafikga sarlavha bering. **(10 ball)**
3. N yil davomida umumiy F summasini to'plash uchun yillik foiz stavkasi r bo'lgan hisobvaraqqa o'tkazilishi kerak bo'lgan depozit hisobvarag'iga oylik P omonatini quyidagi formula yordamida hisoblash mumkin:

Yillik foiz stavkasi 4,35% bo'lsa, 5, 6, 7, 8, 9 va 10 yil davomida 100 000 dollarni to'plash uchun oylik omonat miqdorini hisoblang. Natijalarni ikkita ustunli jadvalda ko'rsating, bu erda birinchi ustun yillar soni, ikkinchi ustun oylik omonat hisoblanadi. **(10 ball)**

1. Odamning tana yog' ulushi (BFP - body fat percentage) formula bo'yicha baholanishi mumkin:

bunda *BMI* – tana massa indeksi, formula bilan topiladi, bunda *W* – tana vazni funtlarda va *H* – tana bo’yi dyuymlarda, Age – odam yoshi, *Gender* = 1 erkaklar uchun va *Gender* = 0 ayollar uchun.

Tana yog’ ulushini (BFP) hisoblaydigan maxsus funksiyani yozing. Funksiya nomi va argumentlari uchun **BFP = BodyFat(w, h, age, gen)** dan foydalaning. Kirish argumentlari mos ravishda vazn, bo’y, yosh va jins (erkaklar uchun 1, ayollar uchun 0). Chiqish argumenti esa BFP. Quyida berilgan odamlarning tana yog’ ulushini hisoblash uchun funksiyadan foydalaning: **(15 ball)**:

а) 35-yoshli erkak, bo’yi 74 dyuym, vazni 220 funt.

1. 22-yoshli ayol, bo’yi 67 dyuym, vazni 135 funt.
2. Imtihonda olingan 30 ta baholar ro'yxati:31, 70, 92, 5, 47, 88, 81, 73, 51, 76, 80, 90, 55, 23, 43, 98, 36, 87, 22, 61, 19, 69, 26, 82, 89, 99, 71, 59, 49, 64.

0 dan 19 gacha, 20 dan 39 gacha, 40 dan 59 gacha, 60 dan 79 gacha va 80 dan 100 gacha nechta baholar borligini aniqlaydigan kompyuter dasturini yozing. Natijalarni quyidagi shaklda ko'rsating:

0 dan 19 gacha bo'lgan baholar 2 ta talaba

20 dan 39 gacha bo'lgan baholar 4 ta talaba

40 dan 59 gacha bo'lgan baholar 6 ta talaba

va b.q.

(*Maslahat: natijalarni ko'rsatish uchun* ***fprintf*** *buyrug'idan foydalaning.*) **(25 ball)**

1-savol

% Define the range of x values from -pi to pi

x = linspace(-pi, pi, 100);

% Define the range of y values from -pi to pi

y = linspace(-pi, pi, 100);

% Create a grid of x and y values

[X, Y] = meshgrid(x, y);

% Calculate the corresponding z values using the function z = cos(xy) \* cos(x^2 + y^2)

Z = cos(X.\*Y) .\* cos(X.^2 + Y.^2);

% Create a new figure window

figure;

% Use the surf function to create the 3D surface plot

surf(X, Y, Z);

% Add labels to the x, y, and z axes

xlabel('x');

ylabel('y');

zlabel('z');

% Add a title to the plot (in Uzbek as in the problem)

title('z = cos(xy) cos(x^2 + y^2) funksiyasining 3D sirt grafigi');

% Add a colorbar to show the mapping of z values to colors

colorbar;

% Optional: Add a grid for better visualization

grid on;

2-savol

% Funksiyani aniqlash

f = @(x) x + 1./(x.^2 - 1);

% Asimptotalardan qochib, x diapazonlarini aniqlash

x1 = linspace(-4, -1.1, 100);

x2 = linspace(-0.9, 0.9, 100);

x3 = linspace(1.1, 4, 100);

% Har bir x diapazoni uchun y qiymatlarini hisoblash

y1 = f(x1);

y2 = f(x2);

y3 = f(x3);

% Yangi figura yaratish

figure;

% Funksiyani uch qismda chizish

plot(x1, y1, 'b');

hold on;

plot(x2, y2, 'r');

plot(x3, y3, 'g');

% X o'qi diapazonini o'rnatish

xlim([-4 4]);

% Y o'qi diapazonini o'rnatish

ylim([-15 15]);

% O'qlarga belgi qo'yish

xlabel('x');

ylabel('f(x)');

% Grafikga sarlavha berish (o'zbek tilida, masaladagidek)

title('f(x) = x + 1/(x^2 - 1) funksiyasi grafigi');

% Afsona qo'shish

legend('Qism 1 (-4 dan -1 gacha)', 'Qism 2 (-1 dan 1 gacha)', 'Qism 3 (1 dan 4 gacha)');

% Asimptotalarni belgilash uchun vertikal chiziqlar (ixtiyoriy)

plot([-1 -1], ylim, 'k--');

plot([1 1], ylim, 'k--');

hold off;

3-savol

% Berilgan qiymatlar

F = 100000; % Kelajakdagi qiymat ($)

r\_annual = 4.35; % Yillik foiz stavkasi (%)

r = r\_annual / 100; % Yillik foiz stavkasi (o'nlik)

yillar = 5:10; % Yillar soni

% Jadvalning sarlavhasini chiqarish

disp('-------------------------');

disp(' Yillar | Oylik to''lov ');

disp('-------------------------');

% Har bir yil uchun oylik to'lovni hisoblash va chiqarish

for N = yillar

oylik\_stavka = r / 12;

davrlar\_soni = 12 \* N;

P = F \* oylik\_stavka / ((1 + oylik\_stavka)^davrlar\_soni - 1);

fprintf(' %2d | $%8.2f \n', N, P);

end

% Jadvalning pastki qismini chiqarish

disp('-------------------------');

4-savol

function bfp = BodyFat(w, h, age, gen)

% BodyFat: Calculates the body fat percentage (BFP).

% BFP = BodyFat(w, h, age, gen) returns the body fat percentage

% for a given weight (w in pounds), height (h in inches), age (in years),

% and gender (gen: 1 for male, 0 for female).

% Calculate Body Mass Index (BMI)

bmi = 703 \* w / (h^2);

% Calculate Body Fat Percentage (BFP)

bfp = 1.2 \* bmi + 0.23 \* age - 10.8 \* gen - 5.4;

end

% --- Calculate BFP for the given individuals ---

% a) 35-year-old male, height 74 inches, weight 220 pounds.

weight\_a = 220;

height\_a = 74;

age\_a = 35;

gender\_a = 1; % Male

bfp\_a = BodyFat(weight\_a, height\_a, age\_a, gender\_a);

fprintf('a) 35 yoshli erkakning tana yog'' ulushi: %.2f%%\n', bfp\_a);

% b) 22-year-old female, height 67 inches, weight 135 pounds.

weight\_b = 135;

height\_b = 67;

age\_b = 22;

gender\_b = 0; % Female

bfp\_b = BodyFat(weight\_b, height\_b, age\_b, gender\_b);

fprintf('b) 22 yoshli ayolning tana yog'' ulushi: %.2f%%\n', bfp\_b);

5-savol

% Imtihonda olingan baholar ro'yxati

baholar = [31, 70, 92, 5, 47, 88, 81, 73, 51, 76, 80, 90, 55, 23, 43, 98, 36, 87, 22, 61, 19, 69, 26, 82, 89, 99, 71, 59, 49, 64];

% Har bir oraliq uchun hisoblagichlarni initsializatsiya qilish

oralik1\_hisobi = 0; % 0 dan 19 gacha

oralik2\_hisobi = 0; % 20 dan 39 gacha

oralik3\_hisobi = 0; % 40 dan 59 gacha

oralik4\_hisobi = 0; % 60 dan 79 gacha

oralik5\_hisobi = 0; % 80 dan 100 gacha

% Baholar ro'yxati bo'ylab iteratsiya qilish va hisoblagichlarni yangilash

for i = 1:length(baholar)

if baholar(i) >= 0 && baholar(i) <= 19

oralik1\_hisobi = oralik1\_hisobi + 1;

elseif baholar(i) >= 20 && baholar(i) <= 39

oralik2\_hisobi = oralik2\_hisobi + 1;

elseif baholar(i) >= 40 && baholar(i) <= 59

oralik3\_hisobi = oralik3\_hisobi + 1;

elseif baholar(i) >= 60 && baholar(i) <= 79

oralik4\_hisobi = oralik4\_hisobi + 1;

elseif baholar(i) >= 80 && baholar(i) <= 100

oralik5\_hisobi = oralik5\_hisobi + 1;

end

end

% Natijalarni ko'rsatish

fprintf(' 0 dan 19 gacha bo''lgan baholar %d ta talaba\n', oralik1\_hisobi);

fprintf(' 20 dan 39 gacha bo''lgan baholar %d ta talaba\n', oralik2\_hisobi);

fprintf(' 40 dan 59 gacha bo''lgan baholar %d ta talaba\n', oralik3\_hisobi);

fprintf(' 60 dan 79 gacha bo''lgan baholar %d ta talaba\n', oralik4\_hisobi);

fprintf(' 80 dan 100 gacha bo''lgan baholar %d ta talaba\n', oralik5\_hisobi);