```
% Initializing the matrices that will store the possible lengths of bar
% AC, the tensions, and the costs.

AC_Costs = [];
AC_Bar_Lengths = [];
Bar_AC_Tension = [];

% Initializing the lowest value for the y and z coordinate of point C.
% They are 1 and -1 respectively.

Y_Coord= 1;
Z_Coord= -1;

% Looping through every single possible value of y and z from the range
% given in the problem to test possible tensions.
for ii = 1:1:51
    for jj = 1:1:51
        % The system of equations utilized to solve for the tensions of the
        % bars given the y and z coordinates.
        System_of_Equations = [(6/(sqrt(36 + (Y_Coord-2)^2 + (Z_Coord-1)^2))),
6/(sqrt(61)), 2/(sqrt(8));
            (Y_Coord-2)/(sqrt(36 + (Y_Coord-2)^2 + (Z_Coord-1)^2)) , -3/(sqrt(61)),
-2/(sqrt(8));
            ((Z_Coord-1)/(sqrt(36 + (Y_Coord-2)^2 + (Z_Coord-1)^2))), 4/sqrt(61),
0];
        Force_Totals = [80; -20; 30];
        Reduced_Matrix = System_of_Equations\Force_Totals;
        % Stores the tension of bar AC, and then calculates the
        % corresponding length based on the coordinates.
        Bar_AC_Tension(jj,ii) = Reduced_Matrix(1);
        AC_Bar_Lengths(jj,ii) = sqrt(36 + (Y_Coord-2).^2 + (Z_Coord-1).^2);
        Z_Coord = Z_Coord+0.1;
    end
    Y_Coord = Y_Coord + 0.1;
    Z_Coord = -1;
end
%Calculates the costs of all the possible bars by multiplying the tension
%by its length.
AC_Costs = AC_Bar_Lengths.*Bar_AC_Tension;
% Finds the lowest possible cost of the bar
lowest_cost = min(AC_Costs, [], 'all');

% Graphing the points collected on labeled graphs.
Y_Values = 1:0.1:6;
Z_Values = -1:0.1:4;
[X,Y] = meshgrid(Y_Values,Z_Values);

Y_Cost = X(AC_Costs == lowest_cost);
Z_Cost = Y(AC_Costs == lowest_cost);

fprintf("The lowest cost of bar AC is %.3f kNm.\nThis optimal location is at (0,
%.1f, %.1f) [m].\n", lowest_cost, y_cost, z_cost);
figure;
mesh(X,Y,AC_Costs);
title('Bar AC Cost');
xlabel('y (m)');
ylabel('z (m)');
zlabel('cost (kNm)');
```