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## QUESTION 2:

```
% Plotting f(theta) on [-pi, pi]
theta_vals = -pi:0.01:pi;

f_vals = f(theta_vals);

figure(1)
plot(theta_vals, f_vals)
xlabel('\theta (radians)')
ylabel('f(\theta)')
title('Plot of f(\theta) on [-\pi, \pi]')
yline(0, '--r');
xline(pi/4, '--g', '\pi/4');
xline(-pi/4, '--g', '-\pi/4');
drawnow;

% Plot clearly shows that there are roots at +/- pi/4
```

## ALL FUNCTIONS SUPPORTING THIS CODE

```
% First f(theta) function
function out = f(theta)

    % Platform lengths
    L1 = 2;
    L2 = sqrt(2);
    L3 = sqrt(2);

    % Angle across from L1
    gamma = pi / 2;

    % Strut lengths
    p1 = sqrt(5);
    p2 = sqrt(5);
    p3 = sqrt(5);

    % Strut base positions
    % Got these from Figure 1.15
    x1 = 4;
    x2 = 0;
    y2 = 4;

    A2 = L3 * cos(theta) - x1;
    B2 = L3 * sin(theta);
```

---

```

A3 = L2 * (cos(theta) * cos(gamma) - sin(theta) * sin(gamma)) - x2;
B3 = L2 * (cos(theta) * sin(gamma) + sin(theta) * cos(gamma)) - y2;

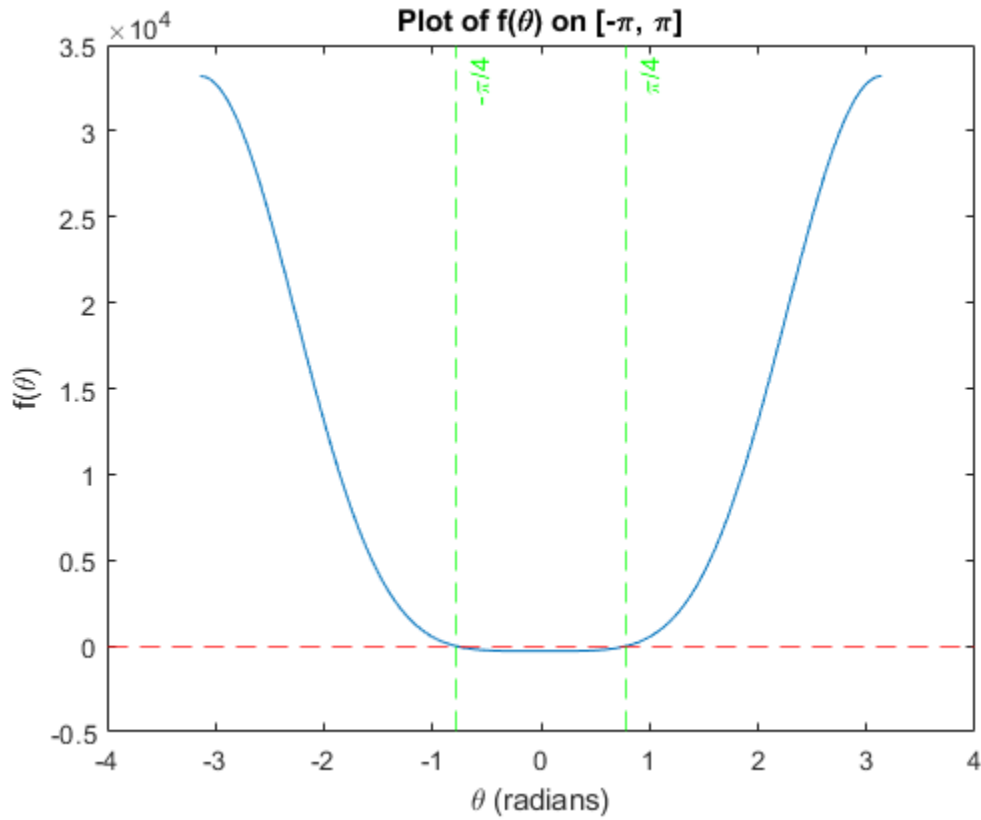
N1 = B3 .* (p2^2 - p1^2 - A2.^2 - B2.^2) - B2 .* (p3^2 - p1^2 - A3.^2 -
B3.^2);
N2 = -A3 .* (p2^2 - p1^2 - A2.^2 - B2.^2) + A2 .* (p3^2 - p1^2 - A3.^2 -
B3.^2);

D = 2 * (A2 .* B3 - B2 .* A3);

out = N1.^2 + N2.^2 - p1.^2 * D.^2;

end

```



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