METBD 050  
Homework No. 20 - Functions, Solving & Graphing

**Part 1: MathCad**

Two functions are given as \( f(x) = -4x^2 + 5x + 15 \) and \( g(x) = 4x + 8 \). In MathCad:

1. Use text regions to include your name, METBD 050.n, Homework 20, and the date at the top of the sheet. Also use text regions as labels to make your work more readable. These calculations should be neatly done and should be clear enough for someone to read and understand what you are doing.

2. Graph both functions in a single graph region. The range variable, \( x \), should start at -5 and end at 5 using a .5 increment. The y-axis extends from -100 to 50. The trace for \( f(x) \) should be a black solid line having a width of 2. The trace for \( g(x) \) should be a black dashed line having a width of 1. Hide the arguments. Use “Graph of Lines”, “x-axis” and “y-axis” as titles for the graph.

3. Determine the points of intersection between \( f(x) \) and \( g(x) \).

4. Find the roots of \( f(x) \).

5. Determine the maximum value of \( f(x) \).

**Part 2: Truss Application:**

From Statics (MCH T 111), two equations can be written to determine the force in members AB and AD. The two equations are:

\[
.8575 \ F_{AB} + .5547 \ F_{AD} = 7000 \\
.5145 \ F_{AB} + .8321 \ F_{AD} = 12000
\]

Use a Find Block in MathCad to determine the magnitude of the member forces in these two members.