Assignment MathCAD 3

1. Solve the following quadratic equation using built-in functions.

   - $3z^2 - 2z + 8 = 0$
   - $2x^2 + 5x - 9 = 0$

2. Solve the systems of linear equations using built-in functions.

(a) $3x + y + 5z = 20$, $2x + 3y - z = 5$, $-x + 4y = 7$
(b) $6x + 2y + 8z = 14$, $x + 3y + 4z = 5$, $5x + 6y + 2z = 7$

3. Create a QuickPlot of the function $f(x) = 1 - e^{-x}$
   Use MathCAD's X-Y Trace dialog to evaluate this function at (a) x = 1, (b) x = 2.5, (c) x = 3.8.

4. The equation describing the process of warming a hot tub by adding hot water is

$$T = T_{IN} - (T_{IN} - T_{START})e^{-\frac{Q}{V}t}$$

   Where T : temperature of the water in the hot tub
   T_{IN}: temperature of the water flowing into the hot tub (130°F)
   T_{START}: initial temperature of the water in the hot tub (65°F)
   Q: hot-water flow rate (% gal. per min.)
   V: volume of the hot tub (500 gal)
   t: elapsed time since the hot water started flowing.

(a) Use QuickPlot to see how long it will take the tub to reach 110°F.
(b) If the hot water flow rate was increased to 10 gal. per min. , how long would it take for the water temperature in the tub to reach 110°F?

5. Plot each of the following three data sets to see whether a straight line through each set of points seems reasonable:

x	Y1	Y2	Y3
0	2	0.4	10.2
1	5	3.6	4.2
2	8	10.0	12.6
3	11	9.5	11.7
4	14	12.0	28.5
5	17	17.1	42.3
6	20	20.4	73.6
7	23	21.7	112.1

   Use **slope**() and **intercept**() to calculate the regression coefficients for the set, then plot the actual data and the corresponding regression line to compare.