Assignment MathCAD 2

 # 1. Write the following sets of simultaneous equations in matrix form, and solve if possible.
(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

 # 2. Create three matrices like the following

$$flow = \begin{vmatrix} 2 \\ 5 \\ 10 \\ 15 \\ 20 \end{vmatrix} \frac{kg}{\min} \qquad T_{cold} = \begin{vmatrix} 62 \\ 43 \\ 26 \\ 20 \\ 14 \end{vmatrix} K \qquad C_p = \begin{vmatrix} 4187 \\ 4187 \\ 4187 \\ 4187 \\ 4187 \end{vmatrix} \frac{joule}{kg \cdot K}$$

Then solve for all five Q_{COLD} values, using element-by-element matrix multiplication. The resulting equation looks like this: $q_{cold} = \overrightarrow{flow \cdot C_p \cdot T_{cold}}$

 # 3. Write the grades as a column vector. (a) Use **sort( )** function to sort the 15 scores (elements 0 to 14) listed below, (b) then display the value of 7^{th} element in the sorted array. 7^{th} element = median (c) Check your result from part (b) by using Mathcad's **median( )** function on the original vector of grades.

Grades = [78 85 43 67 65 98 56 87 90 86 65 79 80 69 71]

 # 4. Find the angle of refraction in **degrees** using the formula, $n_{water} \sin(A) = n_{air} \sin(B)$

A = angle of incidence = $\pi/4$ B = angle of refraction, to be found
$n_{water} = 1.33$ $n_{air} = 1$

Note: inverse of trigonometric functions are **asin(z), acos(z), atan(z), asec(z), acsc(z), acot(z)**

 # 5. Voltage of a circuit can be calculated by **V = I*R**, where **I** is the current and **R** is the resistance. Use 0.1, 0.2, 0.3, 0.4, 0.5 **A** for currents **I** and 3.1, 2.8, 2.5, 2.4, 1.5 **kΩ** for resistances **R**. Calculate the voltage for the given currents and resistances. Apply matrix **Element-by-Element** operation.