MATH 141:502 – Quiz 3 26 September 2019

Name and NetID:

Question 1. Compute the matrix $(2AB - 3C)^T$, given the following: *[4]*

$$A = \begin{bmatrix} 3 & 2 & 1 \\ 1 & x & 0 \end{bmatrix}, \quad B = \begin{bmatrix} 0 & 1 \\ 2 & 0 \\ 3 & 1 \end{bmatrix}, \quad C = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}.$$

Question 2. A supermarket sells ice cream cones of three different flavors: chocolate, strawberry, and vanilla. Due to different membership cards, Alice, Bob, and Charlie pay according to the following table:

	Chocolate	Strawberry	Vanilla
Alice	\$2.00	\$2.50	\$2.00
Bob	\$1.00	\$3.00	\$1.00
Charlie	\$1.00	\$1.50	\$2.00

assuming that everyone purchases x chocolate, y strawberry, and z vanilla cones:

1. Write a system of linear equations representing the amounts spent by each. *[2]*
2. Convert the above system into matrix format, and assuming $x = 3$, $y = 8$, $z = 5$, determine the total amount spent. *[4]*

Bonus Question. A supermarket sells ice cream cones of three different flavors: chocolate, strawberry, and vanilla. Due to different membership cards, Alice, Bob, and Charlie pay according to the following table:

	Chocolate	Strawberry	Vanilla
Alice	\$2.00	\$2.50	\$2.00
Bob	\$1.00	\$3.00	\$1.00
Charlie	\$1.00	\$1.50	\$2.00

assuming that everyone purchases x chocolate, y strawberry, and z vanilla cones, write the equations describing the linear programming problem which arises if we wish to maximize the total amount spent, subject to the constraints: at least one cone of each flavor must be bought, the total number of cones purchased cannot exceed thirty, and the number of chocolate and strawberry cones bought must together be greater than twice the number of vanilla cones bought. *[4]*