Exam 1 Review over Chapters 1 and 2

- Basic Matrix Operations
- Matrix Multiplication
- Review of Lines
- Modeling with Linear Functions
- Systems of Two Equations in Two Unknowns
- Setting Up and Solving Systems of Linear Equations

1. State the dimensions of matrix A and then state the value of a_{32} given $A = \begin{bmatrix} -6 & 7x & y \\ 5w & -2 & 9 \\ -3y & 1 & 0 \\ 4x & 8 & 10w \end{bmatrix}$.

2. If A is a 2×1 matrix, B is a 2×1 matrix, and C is a 1×2 matrix, determine the size of $(3A + 4B)^T - 0.5C$, if possible.

3. Determine the value of w, x, and y given $\begin{bmatrix} 2 & (w-1) \\ 3 & 4x \end{bmatrix} - \begin{bmatrix} y & -6 \\ -8 & 12 \end{bmatrix}^T = 3\begin{bmatrix} -1 & 7 \\ 3 & -4 \end{bmatrix}$

4. If A is a 2×1 matrix, B is a 2×1 matrix, and C is a 3×2 matrix, determine the size of CAB^T, if possible.

5. Compute $\begin{bmatrix} -3 & 4x & 2 \\ 5w & 0 & 4y \end{bmatrix} \begin{bmatrix} -6 & 4m \\ 2n & 3 \\ -p & 0 \end{bmatrix}$.

6. There are three convenience stores in Riley. Last week, the east store sold 88 gallons of milk, 48 bags of potato chips, 16 boxes of devil food cakes, and 112 cans of soda. The west store sold 105 bags of potato chips, 72 gallons of milk, 21 boxes of devil food cakes, and 147 cans of soda. The north store sold 60 boxes of devil food cakes, 40 bags of potato chips, 50 cans of soda, but no gallons of milk. If all three stores sell a gallon of milk for \$1.59, a can of soda for \$0.79, a bag of potato chips for \$1.19 and a box of devil food cakes for \$1.99, use matrix multiplication to compute how much money did each store bring in last week?

7. Write the equation of the line that passes through the point $(6, -7)$ and has a slope of zero.

8. You have a line which passes through the points $(-3, -4)$ and $\left(\frac{1}{2}, \frac{2}{3}\right)$. If x decreases by 8 units, what is the corresponding change in y?

9. An automobile purchased for use by the manager of a firm at a price of \$14,000 is to be depreciated using a linear model over ten years. What will the book value of the automobile be at the end of five years, if the automobile has a scrap value of \$1,000 at the end of 10 years?

10. Dave sells widgets at his widget stand. He buys the widgets for \$5 each. When he sells 30 in a month, then his profit is \$276. When he sells 20 widgets in a month, then his cost for that month is \$514.

(a) Determine the linear cost function.

(b) Determine the linear revenue function.

(c) Determine the linear profit function.

(d) Determine and interpret the break-even point.

11. If an ipod costs \$400, 2000 sell. If the price increases to \$500, then 1500 sell. The producer is willing to provide 700 ipods if the price is \$580 and are willing to provide 1300 ipods when the price is \$940. Assume supply and demand are linear.

(a) Determine the linear supply equation.

(b) Determine the linear demand equation.

(c) Determine and interpret the equilibrium point.