1. The salary scales in three school districts are as follows, for a teacher with a master’s degree:

District P: $30,000 plus $1,500 for each year of experience

District Q: $30,000 plus $1,750 for each year of experience

District R: $28,000 plus $1,750 for each year of experience

1. Give a formula for the salary in each district for a teacher with *n* years of experience
2. Use your formulas to indicate the number of years experience teachers have in districts P and R when they earn the same salary.
3. Use your formulas to indicate the number of years experience teachers have in districts P and Q when they earn the same salary
4. Use your formulas to indicate the number of years experience teachers have in districts Q and R when they earn the same salary

Teachers from districts Q and R will never earn the same salary since

1. If in District T, teachers ear a salary dollars plus dollars for each year of experience, and in District U, teachers earn a salary of dollars plus dollars for each year of experience, and , how many years will it take District U teachers to catch up to District T.

It would take district U years to catch up to district T provided and

1. Let and Show that and thus prove that multiplication of matrices is associative.
2. a. Show steps in solving the systems and for *w*, *x*, *y*, and *z* in terms of *a*, *b*, *c*, and *d*, without using matrices.
3. Rewrite the systems of equations as and   
   (You could also choose to write them in terms of *x* and *y* WLOG)
4. Set the first equations from both systems equal to each other and solve for *w*
5. Set the second equations from both systems equal to each other and solve for *z*
6. Plug the value for *w* into one of the original first equations of a system and solve for *x*.   
   (It does not matter which one or that you use the original. However, the calculations are simpler this way.)
7. Plug the value for *z* into one of the original second equations of a system and solve for *y*.  
   (It does not matter which one or that you use the original. However the calculations are simpler this way.)
8. b. Explain why part **a** determines the multiplicative inverse of a matrix

The inverse of a matrix exists if and only if there exists a matrix such that by the definition of a multiplicative inverse matrix. When these two matrices are multiplied together, you get the systems of equations presented in part **a**. Since part **a** determines the values of *w*, *x*, *y*, and *z* are when and those values make up the inverse of a general matrix, part **a** determines the multiplicative inverse of a matrix.

1. Use matrices to solve each system for .

and

1. , assuming

and , provided