Algebra II

Logistics Final Activity Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Equipment Costs (You will be able to fill in this table at the completion of this analysis.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Equipment Cost | Total Cost | # of years | runs per year | Cost per run | Divide by 2 for headhaul only |
| Tractor: 85,000 + interest = |  |  |  |  |  |
| Trailer: 26000 + interest = |  |  |  |  |  |

1. Write the equation for a geometric sequence.

an = ar(n-1)

1. Write the equation for a geometric series.

The equation used to calculate the monthly payments for a loan is:

P is the original loan amount

M is the monthly payment

R is the interest rate

12 is the number of payments per year

n is the total number of payments

For simplicity, from now on we will write the as (1 + r)

The inside of the brackets is a geometric sequence with a starting value of (1 + r)-1 and a rate of change that is also (1 + r)-1.

1. Write the explicit formula for the geometric sequence above:

an = (1 + r)-1·[(1 + r)-1](n-1)

1. Write the formula for the sum of the finite geometric series for the sequence in the brackets.
2. Substitute the geometric series from question 4 into the above equation for the original loan amount.
3. Simplify the equation to remove all of the exponents of -1.
4. Solve this equation for M.
5. Lastly, to get the total cost including interest you need to multiply the monthly payment amount by the number of months. Use the numbers for the Nomadic Transportation problem, determine the total cost of purchasing the truck and the trailer, and fill in the table. Don’t forget that n is the number of months and we simplified our equation by making just r. Since we used 5.5% as our interest rate the r value in the equation you solved is .004583.

Total Cost of the tractor: $97,415.90

Total Cost of the trailer: $32,196.70

1. Another equation for monthly payments is given below. Start with your equation from question 7 and manipulate it to get this new equation that does not have any negative exponents.