To validate the profitability of the recommendation engine, we need to assess how the cost of recommendations relates to the revenue generated from movie recommendations.

We need to find out:

1) Conversion Rate (x):
    - This is the percentage of recommendations that result in a rental or purchases to assess the effectiveness of the recommendation
2) Revenue from Conversions (ConvRev):
    - Rental, purchase, membership fees generate different revenue amounts. The average revenue per conversion will depend on the mix of them

Profit from **Recommendations=(ConvRev X Recommendations)−(Cost per Recommendation×Total Recommendations)**

Say: Assuming a conversion rate of 5% and an ConvRev of $8:

Profit=(0.05 x 8 x total Recommendations)−($0.01×Total Recommendations)

Let's calculate this for a hypothetical scenario of 100,000 total recommendations.

The profit from the recommendation engine would be (8 * 0.05 * 100,000) - (0.01 * 100, 000) = 39,000

To include storage cost:

then Profit is updated to **Profit=($8×Total Recommendations×0.05)−($0.01×Total Recommendations) - storage cost**

Storage Costs for Rentals = (Number of Rentals from Recommendations) * (Cost of Storing Uncompressed) * (Rental Days)

Let us assume that 70% of the conversions are rentals which incur storage costs for a maximum of 3 days.

Storage cost is: 70% x Total Recommendations×0.05 x 0.75 x 3 = 2625

Final profit: 39,000 - 2625 = 36,375