Findings Report

Key Findings and Patterns

The dataset contained **250** rows and **10** columns, with **no** *missing values or duplicates*. A correction was made to the existing lead_time column, which was recalculated using the difference between delivery_date and order_date. From the dataset, we can see that orders were placed between *January and April*. **March** marked the highest with **106** orders, while **January** had the fewest with only **27**.

Inventory levels showed a *large variation*. **New York** held the maximum inventory of **499** units in *April*, while **Chicago** recorded the lowest with just **one** unit in *January*. This imbalance highlights inefficiencies in stock distribution. Supplier performance also *varied*. **Supplier B** maintained the shortest average lead time at 10 days, while Suppliers C and B (based in San Francisco and Chicago) fulfilled the most orders. Supplier A, however, had the highest rate of late deliveries. Overall, 50.8% of all shipments were delayed, with the **Furniture** category most affected (58.33% late).

Stockouts were most common in **Dallas**, with **Electronics** as the *most affected category.* These stockouts peaked in *March*, aligning with the seasonal demand spike. *I calculated the late cost as 10% of total inventory cost for late deliveries, and then re-estimated this after simulating a 10% improvement in lead time per supplier.* This simple simulation suggested that enforcing better lead-time performance and accountability could generate savings of approximately ***$105,000****.*

Recommendations to Improve Supplier or Inventory Strategy

- **First**, *Furniture and Electronics* require targeted strategies. Furniture deliveries should be prioritized with buffer stock placed closer to demand centers and backup suppliers identified. Electronics should move to a dynamic safety stock policy that adapts to demand spikes in months like March.
- **Second**, supplier allocations should be adjusted based on performance. Orders should be shifted away from *Supplier A*, which had the highest rate of late deliveries, and redistributed to *Suppliers B and C*. I recommend that a *supplier tracking system* with penalties and incentives would improve accountability.
- **Third**, a data-driven reorder point (ROP) system should be introduced. Average daily demand can be estimated using inventory divided by lead time(if we can track this value, it would be even more accurate), with a safety stock buffer of *20 %*. Implementing this across all categories and locations will help reduce both stockouts and excess inventory.

If I Were the Supply Chain Manager

I would prioritize **demand forecasting**, especially for the demand, to ensure warehouses are pre-stocked. Real-time alerts for inventory levels would help prevent shortages before they escalate.

I would also conduct monthly/quarterly **supplier performance** reviews to ensure reliability and rearrange allocations toward the best-performing suppliers. Finally, I would introduce predictive reorder models to cut delays and stockouts by 15 - 20% (approx), making the supply chain more resilient and cost-efficient.