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## 📊 **Mint Classics Inventory Analysis & Optimization Plan**

This analysis aims to identify inefficiencies across warehouses, evaluate product performance, and recommend strategic actions to optimize inventory and improve operational efficiency. By leveraging SQL queries, we explore revenue generation, inventory imbalances, and seasonal patterns to make data-driven decisions.

### 📦 ****1. Warehouse Revenue Performance****

**Objective:** Identify which warehouse generates the most revenue and how inventory value aligns with actual sales.

|  |  |  |
| --- | --- | --- |
| **Warehouse** | **Revenue** | **Revenue If All Stock Is Sold** |
| East | 195398494 | 31783446731 |
| North | 107501691 | 16517982009 |
| South | 93766669 | 9368915172 |
| West | 93385174 | 13342715574 |

**Key Insights:**

* **East Warehouse** is the dominant revenue generator with $195,398,494 in total revenue and the largest potential revenue if all stock is sold ($317,834,467.31). This suggests strong demand and sufficient inventory.
* **South Warehouse** consistently underperforms, with the lowest revenue ($93,766,669) and stock value ($93,689,151.72), making it a candidate for consolidation or closure.
* **North and West Warehouses** show intermediate performance but exhibit inventory inefficiencies.

✅ **Recommendations:**

* **Close or Consolidate the South Warehouse** to reduce operational costs and simplify inventory management.
* **Reallocate Surplus Stock** from South to North and West to balance inventory.
* **Prioritize High-Demand Products** in the East Warehouse to capitalize on strong sales trends.
* **Enhance Forecasting Models** to better predict future demand and prevent future stock imbalances.

### 🔝 ****2. Top-Selling Products by Warehouse****

**Objective:** Identify which products contribute the most revenue and their warehouse location.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Product** | **Warehouse** | **Quantity Sold** | **Revenue** | **Stock** |
| 1992 Ferrari 360 Spider red | East | 1808 | 16532352 | 8347 |
| 2001 Ferrari Enzo | East | 1019 | 11434199 | 3619 |
| 1952 Alpine Renault 1300 | East | 961 | 11120692 | 7305 |
| 2003 Harley-Davidson Eagle Drag Bike | North | 985 | 10110040 | 5582 |
| 1968 Ford Mustang | East | 933 | 9258159 | 68 |
| 1969 Ford Falcon | East | 965 | 8682105 | 1049 |
| 2002 Suzuki XREO | North | 1028 | 8671180 | 9997 |
| 1928 Mercedes-Benz SSK | West | 880 | 8464720 | 548 |
| 1980s Black Hawk Helicopter | North | 1040 | 8363680 | 5330 |
| 1957 Corvette Convertible | East | 1013 | 7989531 | 1249 |
| 1917 Grand Touring Sedan | West | 918 | 7646940 | 2724 |
| 1948 Porsche Type 356 Roadster | East | 948 | 7500576 | 8990 |
| 1962 Volkswagen Microbus | South | 1029 | 6837705 | 2327 |
| 1976 Ford Gran Torino | East | 915 | 6725250 | 9127 |
| 1957 Chevy Pickup | South | 1056 | 6631680 | 6125 |
| 1932 Model A Ford J-Coupe | West | 957 | 6569805 | 9354 |
| 1999 Indy 500 Monte Carlo SS | East | 855 | 6433020 | 8164 |
| 1998 Chrysler Plymouth Prowler | East | 986 | 6134892 | 4724 |
| 1903 Ford Model A | West | 883 | 6030007 | 3913 |
| 1969 Corvair Monza | East | 963 | 5964822 | 6906 |
| 1940 Ford Pickup Truck | South | 999 | 5828166 | 2613 |
| ATA: B757-300 | North | 973 | 5771836 | 7106 |
| 1958 Setra Bus | South | 972 | 5712444 | 1579 |
| 1969 Dodge Charger | East | 992 | 5597856 | 7323 |

**Key Insights:**

* **East Warehouse** dominates the list of top-selling products, with vehicles like the **1992 Ferrari 360 Spider** and **2001 Ferrari Enzo** driving the most revenue.
* **South Warehouse** does not contribute any product to the top 13 revenue-generating items, highlighting its weak product mix.
* **High-demand products** are concentrated in specific warehouses, creating regional supply gaps.

✅ **Recommendations:**

* **Redistribute High-Demand Products** to understocked regions (North and West) to meet customer needs.
* **Revise South Warehouse Inventory** by removing low-demand items and optimizing stock for better-performing categories.
* **Implement a Data-Driven Restocking System** to ensure optimal inventory levels based on historical sales patterns.
* **Focus on Best-Selling Products** by optimizing storage and delivery processes for these high-demand items.

### 📉 ****3. Inventory Imbalances and Stock Discrepancies****

**Objective:** Evaluate inventory against actual orders to identify overstocked and understocked products.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Product** | **Line** | **Warehouse** | **Stock** | **Quantity Ordered** | **Difference** |
| 2002 Suzuki XREO | Motorcycles | North | 9997 | 1028 | 8969 |
| 1995 Honda Civic | Classic Cars | East | 9772 | 917 | 8855 |
| America West Airlines B757-200 | Planes | North | 9653 | 984 | 8669 |
| 2002 Chevy Corvette | Classic Cars | East | 9446 | 894 | 8552 |
| 1932 Model A Ford J-Coupe | Vintage Cars | West | 9354 | 957 | 8397 |
| 1982 Ducati 996 R | Motorcycles | North | 9241 | 906 | 8335 |
| 1912 Ford Model T Delivery Wagon | Vintage Cars | West | 9173 | 991 | 8182 |
| 1976 Ford Gran Torino | Classic Cars | East | 9127 | 915 | 8212 |
| 1968 Dodge Charger | Classic Cars | East | 9123 | 925 | 8198 |
| 1965 Aston Martin DB5 | Classic Cars | East | 9042 | 914 | 8128 |
| 1948 Porsche Type 356 Roadster | Classic Cars | East | 8990 | 948 | 8042 |
| 1948 Porsche 356-A Roadster | Classic Cars | East | 8826 | 972 | 7854 |
| American Airlines: MD-11S | Planes | North | 8820 | 1085 | 7735 |
| 1937 Lincoln Berline | Vintage Cars | West | 8693 | 1111 | 7582 |
| 1936 Mercedes-Benz 500K Special Roadster | Vintage Cars | West | 8635 | 960 | 7675 |
| 1950's Chicago Surface Lines Streetcar | Trains | South | 8601 | 934 | 7667 |
| 1992 Ferrari 360 Spider red | Classic Cars | East | 8347 | 1808 | 6539 |
| 1904 Buick Runabout | Vintage Cars | West | 8290 | 990 | 7300 |
| 1964 Mercedes Tour Bus | Trucks and Buses | South | 8258 | 1053 | 7205 |
| 1966 Shelby Cobra 427 S/C | Classic Cars | East | 8197 | 915 | 7282 |
| 1999 Indy 500 Monte Carlo SS | Classic Cars | East | 8164 | 855 | 7309 |
| 1971 Alpine Renault 1600s | Classic Cars | East | 7995 | 969 | 7026 |
| 1969 Harley Davidson Ultimate Chopper | Motorcycles | North | 7933 | 1057 | 6876 |
| 1917 Maxwell Touring Car | Vintage Cars | West | 7913 | 992 | 6921 |

**Key Insights:**

* **North Warehouse** experiences frequent stock deficits in high-demand items, such as the **2002 Suzuki XREO** and **America West Airlines B757-200**, risking stockouts.
* **South Warehouse** holds excess inventory of low-demand products, contributing to inefficiencies.
* **West Warehouse** also faces significant deficits, suggesting logistical challenges.

✅ **Recommendations:**

* **Balance Inventory:** Transfer excess products from the South to North and West to address shortages.
* **Logistical Improvements:** Optimize delivery processes to improve stock replenishment in the West Warehouse.
* **Dynamic Inventory Management:** Implement an automated system to monitor and adjust stock levels in real time.
* **Review and Streamline Supply Chains** to reduce delivery lead times and minimize stock shortages.

### 📆 ****4. Seasonal Sales Patterns****

**Objective:** Identify peak sales periods to align inventory with seasonal demand.

|  |  |  |
| --- | --- | --- |
| **Year** | **Month** | **Quantity Ordered** |
| 2003 | 11 | 10862 |
| 2004 | 11 | 10678 |
| 2003 | 10 | 5731 |
| 2004 | 10 | 5483 |
| 2004 | 12 | 4808 |
| 2005 | 5 | 4759 |
| 2004 | 8 | 4564 |
| 2005 | 3 | 4207 |
| 2005 | 4 | 3836 |
| 2004 | 6 | 3748 |
| 2004 | 7 | 3576 |
| 2005 | 1 | 3395 |
| 2005 | 2 | 3393 |
| 2004 | 1 | 3245 |
| 2004 | 9 | 3171 |
| 2004 | 2 | 3117 |
| 2003 | 12 | 2961 |
| 2004 | 5 | 2688 |
| 2003 | 9 | 2510 |

**Key Insights:**

* **Autumn (September-November)** and **Winter (December-February)** are the most profitable seasons, with **November** consistently generating the highest sales.
* Sales significantly decline during **Spring (March-May)** and **Summer (June-August)**, reflecting strong seasonality.

✅ **Recommendations:**

* **Seasonal Stock Optimization:** Increase inventory during peak seasons (Autumn and Winter) to meet demand.
* **Pre-Season Promotions:** Launch marketing campaigns in early Autumn to generate customer anticipation.
* **Staffing Adjustments:** Enhance warehouse capacity and increase staff during high-sales months to ensure smooth operations.
* **Implement Seasonal Demand Models:** Use historical sales data to anticipate and prepare for future seasonal spikes.

### 📌 ****5. Product Line Performance****

**Objective:** Analyze product categories to determine their revenue contribution and optimize distribution.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Line** | **Warehouse** | **Revenue** | **Units Sold** | **Stock Available** |
| Classic Cars | East | 195398494 | 35582 | 5844033 |
| Vintage Cars | West | 93385174 | 22933 | 3439570 |
| Motorcycles | North | 59966501 | 12778 | 1915517 |
| Trucks and Buses | South | 51741419 | 11001 | 1003828 |
| Planes | North | 47535190 | 11872 | 1744036 |
| Ships | South | 33624624 | 8532 | 732251 |
| Trains | South | 8400626 | 2818 | 450792 |

**Key Insights:**

* **Classic Cars** (East Warehouse) are the most profitable product line, generating $195,398,494 in revenue.
* **Trucks and Buses** and **Ships** (South Warehouse) have low revenue and are overstocked, indicating poor performance.

✅ **Recommendations:**

* **Diversify Inventory:** Shift underperforming categories (e.g., Ships) to other regions or consider discontinuing them.
* **Stock Popular Lines:** Prioritize fast-moving lines like Classic Cars in high-demand regions.
* **Bundle Promotions:** Offer bundles of low-performing products with high-demand ones to clear excess inventory.
* **Continuous Product Line Review:** Regularly assess product line performance to maintain a balance between high and low performers.

### 📊 ****Strategic Next Steps****

1. **Warehouse Consolidation:** Close or merge the South Warehouse to reduce overhead and improve efficiency.
2. **Inventory Reallocation:** Transfer surplus products from low-demand areas (South) to high-demand regions (North and West).
3. **Operational Efficiency:** Optimize logistics in the West Warehouse and implement automated inventory tracking.
4. **Seasonal Preparation:** Align inventory and marketing strategies with peak sales periods for better demand fulfillment.
5. **Enhanced Data Utilization:** Implement advanced analytics and predictive modeling to further refine inventory decisions.

By implementing these recommendations, the company can improve inventory efficiency, reduce costs, and enhance customer satisfaction through better product availability.