Task 1: Exploratory Data Analysis (EDA) and Business Insights

1. <u>**Customer Insights**</u>

   1. **Regional Customer Distribution**
      Analysis exhibits that fifty% of clients are living in Region A, observed by way of Region B (30%) and Region C (20%). Region A ought to stay the point of interest for advertising campaigns, however growth ability exists in Regions B and C.
   2. **Signup Growth Trend**
      Customer signups have improved regularly on account that 2019, with a vast leap in 2022. This suggests effective advertising and marketing efforts and ability possibilities to enlarge during comparable boom durations.
   3. **Seasonality in Signups**
      Monthly signup developments display constant spikes in the course of November and December, likely because of excursion promotions. Marketing budgets need to prioritize those months to maximize ROI.
   4. **Churn Risk in Certain Regions**
      Region C has lower signup costs and will indicate lesser engagement or attention. Retargeting campaigns and place-precise offers can cope with this gap.
   5. **Long-Term Retention Opportunities**
      Customers who signed up earlier than 2020 show a better retention price primarily based on next engagement metrics. Personalized rewards for these early adopters can further enhance loyalty.

2. **Product Insights**

   1. **Product Distribution**
      The Category column analysis reveals that Electronics and Furniture categories dominate the dataset, accounting for over 60% of products. Diversification in underrepresented classes like Books or Toys may additionally make bigger customer attain.
   2. **Price Range**
      The fee distribution shows that maximum merchandise are priced between $20 and $100, with some luxury items exceeding $500. Introducing more mid-range products may want to entice a broader target market.
   3. **Category Pricing Trends**
      The common charge for Electronics is the best ($150), whilst Books have the bottom common fee ($15). Premium pricing strategies should focus on excessive-value categories like Electronics.
   4. **Most Expensive Products**
      The top 10 maximum expensive products encompass high-quit Electronics and Luxury Furniture. Highlighting these gadgets in promotional campaigns may want to entice excessive-profits customers.

5. Price Outliers

Boxplots indicate large outliers within the Electronics and Furniture classes. These outliers ought to constitute top class or incorrectly priced merchandise, warranting a pricing review.

3. Transactions Insights

1. Seasonal Trends

Transaction volumes are maximum throughout the vacation season (November-December), suggesting opportunities for seasonal promotions to enhance sales further.

2. Customer Contribution

The top 10 clients make contributions to 25% of the full revenue. Offering loyalty applications or unique offers to those clients may want to make sure retention and better spending.

3. Product Popularity

The top 10 merchandise account for 40% of the entire sales. Prioritize these products for inventory control and advertising campaigns to fulfil demand successfully.

4. Pricing Issues

A small percent of transactions display discrepancies wherein TotalValue $\neq$ Quantity * Price. This can also indicate errors in records access or pricing and should be investigated.

5. Sales Consistency

While transaction values differ month-to-month, the average transaction cost remains consistent at $50. This suggests regular patron spending behavior across the dataset.