### \*\*Week 1: Introduction to Supply Chain Analytics\*\*

1. \*\*What is the primary objective of Supply Chain Analytics?\*\*

- A) To minimize production costs

- B) To combine and analyze data for decision-making

- C) To ensure all supply chain partners follow the same strategy

- D) To automate all processes within the supply chain

\*\*Answer\*\*: B

2. \*\*Which of the following best describes "Supply Chain Management"?\*\*

- A) The process of controlling the flow of information between departments

- B) The process of managing activities from raw materials to final product delivery

- C) The process of forecasting market demand for a product

- D) The process of analyzing customer reviews to improve product quality

\*\*Answer\*\*: B

3. \*\*Which type of analytics focuses on understanding past data to explain current outcomes?\*\*

- A) Descriptive Analytics

- B) Predictive Analytics

- C) Diagnostic Analytics

- D) Prescriptive Analytics

\*\*Answer\*\*: C

4. \*\*Data Analytics in supply chains helps to:\*\*

- A) Decrease customer involvement in production

- B) Improve data security across the chain

- C) Identify meaningful patterns and make data-driven decisions

- D) Eliminate the need for logistics planning

\*\*Answer\*\*: C

1. \*\*What is the primary purpose of Supply Chain Analytics?\*\*

- A) To automate all supply chain processes

- B) To combine and analyze data for better decision-making

- C) To eliminate the need for inventory management

- D) To predict customer demand with 100% accuracy

\*\*Answer\*\*: B

2. \*\*Which of the following best describes Supply Chain Management (SCM)?\*\*

- A) Managing the flow of goods and services, from raw materials to final product delivery

- B) Managing only the transportation of goods from suppliers to warehouses

- C) Organizing customer feedback to improve product design

- D) Automating all production and distribution processes

\*\*Answer\*\*: A

3. \*\*Which type of analytics answers the question "What happened?"\*\*

- A) Diagnostic Analytics

- B) Predictive Analytics

- C) Descriptive Analytics

- D) Prescriptive Analytics

\*\*Answer\*\*: C

4. \*\*What does \*\*Predictive Analytics\*\* aim to do?\*\*

- A) Summarize historical data

- B) Diagnose the root cause of issues

- C) Forecast future outcomes based on historical data

- D) Provide recommendations on the best course of action

\*\*Answer\*\*: C

5. \*\*Which of the following is an example of unstructured data in supply chains?\*\*

- A) Product prices listed in an Excel spreadsheet

- B) Customer reviews written in free-text format

- C) Inventory levels stored in a database

- D) Shipment delivery times recorded in a CSV file

\*\*Answer\*\*: B

6. \*\*What type of analytics is used to provide recommendations based on data analysis?\*\*

- A) Descriptive Analytics

- B) Diagnostic Analytics

- C) Predictive Analytics

- D) Prescriptive Analytics

\*\*Answer\*\*: D

7. \*\*In the context of supply chain management, what does the term "raw materials" refer to?\*\*

- A) Finished products ready for distribution

- B) The basic inputs required to manufacture a product

- C) Unused inventory stored in warehouses

- D) Customer feedback used for product improvement

\*\*Answer\*\*: B

8. \*\*What is the primary benefit of using analytics in supply chains?\*\*

- A) Reducing the need for manual labor in production

- B) Gaining better insights and making data-driven decisions

- C) Ensuring all products are delivered on time

- D) Completely automating customer service

\*\*Answer\*\*: B

9. \*\*Which type of data is commonly used in Supply Chain Analytics for structured analysis?\*\*

- A) Unstructured data from social media

- B) Numerical data stored in databases or spreadsheets

- C) Images of products

- D) Audio recordings of customer service calls

\*\*Answer\*\*: B

10. \*\*Which of the following is an example of a decision that can be made using data analytics in supply chains?\*\*

- A) Predicting which products will be most popular next season

- B) Setting up a social media account for the company

- C) Designing a new marketing strategy

- D) Choosing new office furniture

\*\*Answer\*\*: A

### \*\*Week 2: Supply Chain Basics\*\*

5. \*\*What is Horizontal Integration?\*\*

- A) Expanding control over the supply chain by acquiring suppliers

- B) Expanding control over the supply chain by acquiring customers

- C) Acquiring another business operating at the same level of the supply chain

- D) Reducing production levels to match demand

\*\*Answer\*\*: C

6. \*\*Which of the following is NOT a benefit of Vertical Integration?\*\*

- A) Securing production processes

- B) Gaining control over quality

- C) Increasing flexibility in market changes

- D) Owning the profit of an entity in the chain

\*\*Answer\*\*: C

7. \*\*Customer involvement in supply chains can help reduce costs related to:\*\*

- A) Product development

- B) Marketing and sales

- C) Transportation and warehousing

- D) Employee training

\*\*Answer\*\*: C

8. \*\*What is the main principle of Lean Manufacturing (Just-in-Time)?\*\*

- A) Maximizing inventory to meet unexpected demand

- B) Producing goods only as they are needed, reducing inventory waste

- C) Centralizing production processes in one location

- D) Offering customers a wide variety of product choices

\*\*Answer\*\*: B

9. \*\*Outsourcing in supply chains is primarily done to:\*\*

- A) Ensure higher control over production quality

- B) Reduce operational costs and focus on core competencies

- C) Improve employee satisfaction

- D) Simplify supply chain management processes

\*\*Answer\*\*: B

10. \*\*Which of the following is a characteristic of Agile Production?\*\*

- A) High levels of inventory

- B) Inflexibility to market changes

- C) Ability to adapt quickly to market demand shifts

- D) Increased reliance on vertical integration

\*\*Answer\*\*: C

1. \*\*Which of the following best describes a supply chain?\*\*

- A) A network of suppliers and manufacturers within one company

- B) The process of transforming raw materials into finished products and delivering them to customers

- C) A system for automating product design

- D) A marketing process to attract customers

\*\*Answer\*\*: B

2. \*\*Supply Chain Management (SCM) aims to:\*\*

- A) Automate all production processes

- B) Minimize costs and increase efficiency in the flow of goods and services

- C) Create new product designs based on customer feedback

- D) Focus solely on transportation and logistics

\*\*Answer\*\*: B

3. \*\*What is Horizontal Integration in supply chains?\*\*

- A) Acquiring suppliers that provide raw materials for production

- B) Gaining control over distribution channels

- C) Acquiring companies at the same level in the supply chain

- D) Expanding production facilities

\*\*Answer\*\*: C

4. \*\*Which of the following is an example of Backward Vertical Integration?\*\*

- A) A retail company acquiring a transportation business

- B) A company purchasing its suppliers to gain control over raw materials

- C) A manufacturer buying a chain of retail stores

- D) A company partnering with its customers to co-create products

\*\*Answer\*\*: B

5. \*\*What is the main benefit of involving customers in the production process?\*\*

- A) It allows the company to increase the product price

- B) It reduces costs related to transportation and storage

- C) It minimizes the need for raw materials

- D) It increases lead time

\*\*Answer\*\*: B

6. \*\*Agile Production in supply chains focuses on:\*\*

- A) Maximizing production speed without concern for quality

- B) Being flexible and quickly adjusting to market demand changes

- C) Reducing costs by eliminating customer feedback loops

- D) Stockpiling large amounts of inventory to avoid stockouts

\*\*Answer\*\*: B

7. \*\*What does Lean Manufacturing (Just-in-Time) aim to achieve?\*\*

- A) Keeping a large inventory to prevent shortages

- B) Reducing production time by avoiding customer involvement

- C) Minimizing waste by producing only what is needed, when it is needed

- D) Increasing production speed by automating processes

\*\*Answer\*\*: C

8. \*\*Which of the following is a key feature of Material Requirement Planning (MRP)?\*\*

- A) Forecasting customer demand for future seasons

- B) Ensuring materials are available for production and products are available for delivery

- C) Automating the customer service process

- D) Creating a marketing campaign for new products

\*\*Answer\*\*: B

9. \*\*What is Outsourcing in the context of supply chain management?\*\*

- A) Bringing production processes back to the home country

- B) Hiring an external company to perform tasks that were previously done in-house

- C) Purchasing more materials from a supplier located overseas

- D) Moving production facilities closer to the target market

\*\*Answer\*\*: B

10. \*\*Which of the following is an example of the "7 R’s" of logistics?\*\*

- A) Delivering the right product, to the right customer, at the right time

- B) Increasing the size of warehouse facilities to accommodate more inventory

- C) Automating the production process to minimize lead times

- D) Partnering with customers to improve product designs

\*\*Answer\*\*: A

3

1. \*\*Which type of analytics focuses on predicting future outcomes based on historical data?\*\*

- A) Descriptive Analytics

- B) Diagnostic Analytics

- C) Predictive Analytics

- D) Prescriptive Analytics

\*\*Answer\*\*: C

2. \*\*What is the primary focus of Descriptive Analytics in supply chains?\*\*

- A) To recommend actions based on data

- B) To understand past events by analyzing data

- C) To find relationships between variables

- D) To optimize logistics and transportation processes

\*\*Answer\*\*: B

3. \*\*Which of the following is an example of unstructured data in supply chains?\*\*

- A) Customer reviews

- B) Sales data in an Excel sheet

- C) Inventory levels in a database

- D) Product prices in a CSV file

\*\*Answer\*\*: A

4. \*\*Which of the following is a key feature of Python as an analytical tool?\*\*

- A) It is a paid proprietary tool used mainly for visualization

- B) It is primarily used for statistical analysis and data mining

- C) It is a free open-source programming language with thousands of libraries

- D) It is a spreadsheet-based tool widely used for data cleaning and reporting

\*\*Answer\*\*: C

5. \*\*Which of the following tools is primarily used for data visualization in supply chains?\*\*

- A) Microsoft Excel

- B) KNIME

- C) Microsoft Power BI

- D) Apache Spark

\*\*Answer\*\*: C

6. \*\*What type of data is primarily used in supply chain analytics?\*\*

- A) Unstructured data

- B) Semi-structured data

- C) Qualitative data

- D) Structured data

\*\*Answer\*\*: D

7. \*\*In the data analytics cycle, what is the first step?\*\*

- A) Data Interpretation

- B) Data Analysis

- C) Data Collection

- D) Data Cleaning

\*\*Answer\*\*: C

8. \*\*What is the purpose of data cleaning in supply chain analytics?\*\*

- A) To visualize trends and patterns in data

- B) To remove duplicates, errors, and irrelevant information from data

- C) To interpret results and provide recommendations

- D) To identify correlations between variables

\*\*Answer\*\*: B

9. \*\*Which of the following is NOT an example of structured data?\*\*

- A) Database tables containing sales information

- B) A CSV file with product prices and inventory levels

- C) Customer feedback in a free-text format

- D) Excel sheets with monthly sales data

\*\*Answer\*\*: C

10. \*\*Which of the following describes the role of KNIME in supply chain analytics?\*\*

- A) It is a spreadsheet tool used for cleaning data

- B) It is a data integration platform used for data mining and machine learning

- C) It is a visualization tool for creating business dashboards

- D) It is a big data processing framework for handling unstructured data

\*\*Answer\*\*: B

4

1. \*\*What is the main goal of Descriptive Analytics?\*\*

- A) To predict future events

- B) To prescribe actions based on data

- C) To summarize historical data and answer "What happened?"

- D) To optimize the supply chain process

\*\*Answer\*\*: C

2. \*\*Which of the following is NOT a measure of central tendency?\*\*

- A) Mean

- B) Variance

- C) Median

- D) Mode

\*\*Answer\*\*: B

3. \*\*Which measure of dispersion shows the average distance of each data point from the mean?\*\*

- A) Mode

- B) Median

- C) Standard Deviation

- D) Range

\*\*Answer\*\*: C

4. \*\*In inventory management, what is Safety Stock?\*\*

- A) The amount of inventory held in reserve to protect against variability in demand and lead times

- B) The optimal amount of inventory to order at one time

- C) The average inventory held over a period

- D) The amount of inventory a company must maintain to avoid taxes

\*\*Answer\*\*: A

5. \*\*What does Inventory Turnover measure in supply chain management?\*\*

- A) The time it takes for a product to be manufactured

- B) The rate at which inventory is sold and replaced over a period

- C) The cost of storing inventory in a warehouse

- D) The time it takes for a supplier to deliver goods

\*\*Answer\*\*: B

6. \*\*Which of the following is a correct formula for Economic Order Quantity (EOQ)?\*\*

- A) EOQ = √(2 x (Demand x Order Cost) / Holding Cost)

- B) EOQ = (Holding Cost + Order Cost) / Demand

- C) EOQ = (Safety Stock + Average Inventory) / 2

- D) EOQ = (Total Inventory Cost + Safety Stock) / Demand

\*\*Answer\*\*: A

7. \*\*Which of the following is an example of a "C" item in ABC analysis?\*\*

- A) Engine parts in a car manufacturing plant

- B) Transmission systems for trucks

- C) Cleaning solvents and office supplies

- D) Fuel injection systems

\*\*Answer\*\*: C

8. \*\*What does the ABC analysis in inventory management aim to achieve?\*\*

- A) To categorize inventory items based on their importance and focus on the most critical ones

- B) To determine the best time to reorder inventory

- C) To calculate the total annual inventory cost

- D) To manage inventory for all items equally

\*\*Answer\*\*: A

9. \*\*Which of the following is a reason for maintaining Safety Stock in inventory management?\*\*

- A) To reduce warehouse costs

- B) To protect against unforeseen events like sudden demand spikes or late deliveries

- C) To increase production efficiency

- D) To avoid paying taxes on unsold inventory

\*\*Answer\*\*: B

10. \*\*Which of the following is a principle for reducing inventory in supply chains?\*\*

- A) Increasing safety stock levels

- B) Using Just-in-Time (JIT) inventory management

- C) Expanding warehouse space

- D) Ordering in larger quantities

\*\*Answer\*\*: B

5

1. \*\*What is the primary goal of Diagnostic Analytics?\*\*

- A) To predict future trends in supply chains

- B) To prescribe the best course of action

- C) To identify the root causes behind events and trends

- D) To calculate optimal inventory levels

\*\*Answer\*\*: C

2. \*\*Which of the following scenarios would likely require Diagnostic Analytics?\*\*

- A) Forecasting demand for a new product

- B) Identifying why certain products frequently experience stockouts

- C) Recommending how much inventory to order next quarter

- D) Summarizing last year's sales data

\*\*Answer\*\*: B

3. \*\*What does a high positive correlation (close to +1) between two variables mean?\*\*

- A) The two variables are unrelated

- B) As one variable increases, the other decreases

- C) As one variable increases, the other also increases

- D) There is no relationship between the two variables

\*\*Answer\*\*: C

4. \*\*Which of the following statements is TRUE regarding hypothesis testing?\*\*

- A) The null hypothesis (H0) is what you try to prove

- B) The alternative hypothesis (H1) is usually what you want to reject

- C) The p-value helps you determine whether to reject the null hypothesis

- D) A p-value greater than 0.05 means the null hypothesis should be rejected

\*\*Answer\*\*: C

5. \*\*In hypothesis testing, what does it mean if the p-value is less than 0.05?\*\*

- A) Fail to reject the null hypothesis

- B) There is insufficient evidence to make a decision

- C) Reject the null hypothesis, there is significant evidence against it

- D) The test was inconclusive

\*\*Answer\*\*: C

6. \*\*Which of the following is a non-parametric alternative to the t-test?\*\*

- A) Z-test

- B) Mann-Whitney U-test

- C) ANOVA

- D) Pearson correlation

\*\*Answer\*\*: B

7. \*\*When is a \*\*One-tailed Test\*\* appropriate in hypothesis testing?\*\*

- A) When you are only interested in detecting a difference in one specific direction

- B) When you want to detect a difference in both directions

- C) When you have more than two groups to compare

- D) When data is normally distributed

\*\*Answer\*\*: A

8. \*\*Which of the following best describes a \*\*Two-tailed Test\*\* in hypothesis testing?\*\*

- A) It tests for a difference in both directions (greater or smaller)

- B) It only tests for an increase in the mean

- C) It is used when data is not normally distributed

- D) It is only used in non-parametric tests

\*\*Answer\*\*: A

9. \*\*Which of the following is an example of a parametric test?\*\*

- A) Mann-Whitney U-test

- B) Wilcoxon signed-rank test

- C) t-test

- D) Kruskal-Wallis test

\*\*Answer\*\*: C

10. \*\*What type of correlation value would indicate a strong negative relationship between two variables?\*\*

- A) 0.90

- B) -0.75

- C) 0.30

- D) -0.25

\*\*Answer\*\*: B

### \*\*Multiple-Choice Questions (Weeks 1-5)\*\*

1. \*\*You are shown an Excel screenshot of a correlation matrix where the correlation coefficient between employee engagement and productivity is 0.89. What does this suggest about the relationship between these variables?\*\*

- A) There is no correlation.

- B) There is a moderate negative correlation.

- C) There is a strong positive correlation.

- D) The correlation is too weak to be of any importance.

\*\*Answer\*\*: C

2. \*\*An Excel output shows a p-value of 0.04 from a t-test comparing the means of two independent samples. Given a significance level of 0.05, what is the appropriate conclusion?\*\*

- A) Fail to reject the null hypothesis as the difference is not significant.

- B) Reject the null hypothesis as there is a significant difference.

- C) Increase the sample size and test again.

- D) Convert the test into a two-tailed test for better accuracy.

\*\*Answer\*\*: B

3. \*\*In an Excel output of an ANOVA test, the p-value is displayed as 0.15. If testing whether three new training programs have different effects on sales performance, what should you do at a 0.05 significance level?\*\*

- A) Conclude that all training programs are equally effective.

- B) Conclude that at least one program is more effective than the others.

- C) Cannot conclude as the results are not statistically significant.

- D) Perform a post-hoc test to find which one is different.

\*\*Answer\*\*: C

4. \*\*A regression analysis in Excel indicates an R-squared value of 0.35 when predicting job satisfaction from salary and working conditions. What does this imply?\*\*

- A) 35% of the variation in job satisfaction is explained by the model.

- B) 65% of the variation in job satisfaction is explained by the model.

- C) Salary and working conditions poorly predict job satisfaction.

- D) The model explains very little about job satisfaction.

\*\*Answer\*\*: A

5. \*\*Based on an Excel screenshot showing logistic regression output with coefficients for different predictors, how would you determine if a predictor is significantly contributing to the model?\*\*

- A) By checking if the coefficient is greater than 1.

- B) By checking the p-value associated with each coefficient.

- C) By ensuring each coefficient's value is positive.

- D) By comparing the coefficients against each other.

\*\*Answer\*\*: B

Here are some multiple-choice questions based on \*\*Week 6: Forecasting or Predictive Analytics\*\* along with explanations:

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### \*\*1. Which of the following methods is most commonly used for predicting future trends based on past data in time series analysis?\*\*

- A) Linear Regression

- B) Moving Averages

- C) Decision Trees

- D) Scatter Plot

\*\*Answer\*\*: B) \*\*Moving Averages\*\*

\*\*Explanation\*\*: Moving Averages is a popular technique in time series forecasting used to smooth out short-term fluctuations and highlight longer-term trends. It involves calculating the average of different subsets of the dataset over time to predict future data points.

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### \*\*2. In a time series analysis, which of the following components is used to describe seasonal fluctuations in data that repeat at regular intervals?\*\*

- A) Trend

- B) Seasonality

- C) Cyclic Patterns

- D) Random Variations

\*\*Answer\*\*: B) \*\*Seasonality\*\*

\*\*Explanation\*\*: \*\*Seasonality\*\* refers to regular patterns that repeat over consistent intervals, such as sales peaks during holiday seasons or weather-related patterns. These repeating cycles are crucial in time series analysis to forecast future data with periodic trends.

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### \*\*3. Which of the following best describes the R-squared value in regression analysis?\*\*

- A) It measures the accuracy of the forecasted values.

- B) It represents the error term in the regression model.

- C) It shows how well the independent variables explain the variance in the dependent variable.

- D) It is the coefficient of the independent variable.

\*\*Answer\*\*: C) \*\*It shows how well the independent variables explain the variance in the dependent variable.\*\*

\*\*Explanation\*\*: The R-squared value, also known as the coefficient of determination, indicates the proportion of the variance in the dependent variable that is predictable from the independent variables. A higher R-squared value suggests a better fit of the model to the data.

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### \*\*4. When using linear regression for forecasting, the equation of the regression line is given as \(Y = a + bX\). What does the coefficient \(b\) represent?\*\*

- A) The intercept of the regression line

- B) The slope of the regression line, showing the relationship between X and Y

- C) The error term in the model

- D) The predicted value of the dependent variable

\*\*Answer\*\*: B) \*\*The slope of the regression line, showing the relationship between X and Y\*\*

\*\*Explanation\*\*: In linear regression, \(b\) represents the slope of the regression line. It indicates how much the dependent variable \(Y\) is expected to change for each one-unit change in the independent variable \(X\). The intercept \(a\) represents the value of \(Y\) when \(X = 0\).

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### \*\*5. If a time series has both a linear trend and seasonality, which of the following models would be appropriate for forecasting?\*\*

- A) Simple Linear Regression

- B) Exponential Smoothing

- C) ARIMA (AutoRegressive Integrated Moving Average)

- D) Moving Averages

\*\*Answer\*\*: C) \*\*ARIMA (AutoRegressive Integrated Moving Average)\*\*

\*\*Explanation\*\*: The \*\*ARIMA\*\* model is a powerful tool in time series forecasting that can handle both trend and seasonality in data. It incorporates autoregression (AR), differencing to remove trends (I), and moving averages (MA) to account for past errors.

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### \*\*6. Which of the following accuracy measures is used to express the average of the squared differences between actual and forecasted values?\*\*

- A) Mean Absolute Error (MAE)

- B) Root Mean Squared Error (RMSE)

- C) Mean Squared Error (MSE)

- D) R-squared

\*\*Answer\*\*: C) \*\*Mean Squared Error (MSE)\*\*

\*\*Explanation\*\*: \*\*MSE\*\* measures the average of the squares of the errors, which are the differences between the actual and forecasted values. Squaring the differences helps penalize larger errors more heavily. It is commonly used to assess the accuracy of a forecasting model.

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### \*\*7. Which of the following time series forecasting techniques applies decreasing weights to past data points, placing more emphasis on recent data?\*\*

- A) Moving Averages

- B) Simple Linear Regression

- C) Exponential Smoothing

- D) Decision Trees

\*\*Answer\*\*: C) \*\*Exponential Smoothing\*\*

\*\*Explanation\*\*: \*\*Exponential Smoothing\*\* is a forecasting technique that applies exponentially decreasing weights to older data, emphasizing recent observations. This makes it suitable for time series with patterns that change over time.

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### \*\*8. What is the purpose of differencing in an ARIMA model?\*\*

- A) To remove the trend component from the time series data

- B) To amplify the cyclic patterns in the data

- C) To smooth out random variations

- D) To calculate the average forecast error

\*\*Answer\*\*: A) \*\*To remove the trend component from the time series data\*\*

\*\*Explanation\*\*: Differencing is used in an ARIMA model to make a time series stationary by removing trends. By calculating the differences between consecutive data points, the model can focus on the underlying seasonality and cyclic patterns, making it easier to forecast future values.

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These questions should help cover the key concepts from \*\*Week 6\*\* related to \*\*Forecasting or Predictive Analytics\*\*. Each question is accompanied by an explanation to clarify the rationale behind the correct answer.