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Data Science & Analytics - Data Science

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Data Science & Analytics

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Question 1:

What is Data Science and how does it differ from traditional analytics?

[ANSWER] Answer & Explanation:

Data Science is an interdisciplinary field that combines statistics, programming, and domain expertise to extract insights from structured and unstructured data.\n\n• Traditional Analytics: Descriptive, uses historical data, answers "what happened"\n• Data Science: Predictive and prescriptive, uses ML algorithms, answers "what will happen" and "what should we do"\n• Tools: Python/R, machine learning, big data technologies\n• Process: Data collection ? cleaning ? analysis ? modeling ? deployment\n\nExample: Traditional analytics shows last quarter sales dropped 15%. Data science predicts next quarter trends, identifies customer segments likely to churn, and recommends targeted retention strategies.

Question 2:

Explain the data science lifecycle and its key phases.

[ANSWER] Answer & Explanation:

The data science lifecycle is a structured approach to solving business problems using data-driven methods and iterative processes.\n\n• Business Understanding: Define objectives and success criteria\n• Data Acquisition: Collect from databases, APIs, web scraping\n• Data Preparation: Clean, transform, handle missing values\n• Exploratory Analysis: Understand patterns, correlations, distributions\n• Modeling: Build and train predictive models\n• Evaluation: Validate model performance and business impact\n• Deployment: Implement in production systems\n\nExample: E-commerce recommendation system starts with understanding user behavior goals, collecting clickstream data, cleaning and feature engineering, building collaborative filtering models, testing accuracy, and deploying real-time recommendations.

Question 3:

What are the essential skills and tools for a data scientist?

[ANSWER] Answer & Explanation:

Data scientists need a combination of technical, analytical, and business skills to effectively solve complex problems.\n\n• Programming: Python/R for analysis, SQL for databases\n• Statistics: Hypothesis testing, probability, statistical inference\n• Machine Learning: Supervised/unsupervised algorithms, model evaluation\n• Tools: Jupyter, pandas, scikit-learn, TensorFlow, Tableau\n• Business Acumen: Domain knowledge, problem-solving, communication\n\nExample: Analyzing customer churn requires SQL to extract data, Python pandas for cleaning, statistical tests for significance, ML models for prediction, and business understanding to interpret results and recommend actionable strategies.

Question 4:

What is Data Science and how does it differ from traditional analytics?

[ANSWER] Answer & Explanation:

Data Science is an interdisciplinary field that combines statistics, programming, and domain expertise to extract insights from structured and unstructured data.\n\n• Traditional Analytics: Descriptive, uses historical data, answers "what happened"\n• Data Science: Predictive and prescriptive, uses ML algorithms, answers "what will happen" and "what should we do"\n• Tools: Python/R, machine learning, big data technologies\n• Process: Data collection ? cleaning ? analysis ? modeling ? deployment\n\nExample: Traditional analytics shows last quarter sales dropped 15%. Data science predicts next quarter trends, identifies customer segments likely to churn, and recommends targeted retention strategies.

Question 5:

Explain the data science lifecycle and its key phases.

[ANSWER] Answer & Explanation:

The data science lifecycle is a structured approach to solving business problems using data-driven methods and iterative processes.\n\n• Business Understanding: Define objectives and success criteria\n• Data Acquisition: Collect from databases, APIs, web scraping\n• Data Preparation: Clean, transform, handle missing values\n• Exploratory Analysis: Understand patterns, correlations, distributions\n• Modeling: Build and train predictive models\n• Evaluation: Validate model performance and business impact\n• Deployment: Implement in production systems\n\nExample: E-commerce recommendation system starts with understanding user behavior goals, collecting clickstream data, cleaning and feature engineering, building collaborative filtering models, testing accuracy, and deploying real-time recommendations.

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[WEB] Website: www.solvemyques.com

[EMAIL] Email: support@solvemyques.com

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