



# Data Technician

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## Day 1: Task 1

Please research and complete the below questions relating to key concepts of cloud.

Be prepared to discuss the below in the group following this task.

### What can cloud computing do for us in the real-world?

Cloud computing offers powerful benefits in the real world by providing on-demand access to computing resources (like storage, processing power, and software) over the internet, without needing to own or maintain physical infrastructure.

What Cloud Computing Can Do for Us (Real-World Benefits):

1. **Cost Savings** – No need to buy or maintain servers; pay only for what you use.
2. **Scalability** – Easily increase or decrease resources as needed (e.g., during peak traffic).
3. **Remote Access** – Access data and applications from anywhere, anytime.
4. **Data Backup & Recovery** – Automated backups and disaster recovery options.
5. **Collaboration** – Multiple users can work on the same data in real-time.
6. **Security** – Leading providers offer advanced security tools and compliance standards.
7. **Speed** – Quickly deploy apps and services without long setup times.

How Netflix Uses Cloud Computing:

- Netflix runs almost all of its operations on Amazon Web Services (AWS).
- It uses the cloud to stream video content to millions of users worldwide.



## How can it benefit a business?

- The cloud allows Netflix to scale up during peak times (like evenings or new show releases) and scale down during low-traffic hours.
  - It also helps Netflix store user data, recommend shows using AI, and deliver content quickly using a global network.
- Result:** Fast, reliable streaming, personalized recommendations, and minimal downtime — all powered by cloud computing.

**Netflix** itself is a consumer streaming service, but the way Netflix operates and the tools it uses can inspire or benefit a business in several ways. Here's how:

1. **Leveraging Data Analytics (Inspired by Netflix):**  
Netflix uses powerful data analytics to understand user behaviour and preferences.

### **Benefit to a business:**

A business can collect and analyse customer data (e.g., buying patterns, browsing history) to:

- Improve customer experience
- Offer personalized products/services
- Make data-driven decisions

2. **Cloud Computing Model:**

Netflix runs entirely on cloud infrastructure (AWS), allowing it to scale and stay online 24/7.

### **Benefit to a business:**

By adopting cloud computing (like AWS, Azure, or Google Cloud), a business can:

- Lower IT costs
- Scale quickly
- Support remote work
- Ensure business continuity



### **3. Customer Experience:**

Netflix focuses on user-friendly design and personalization, keeping users engaged.

#### **Benefit to a business:**

Applying similar strategies, a business can:

- Create smoother digital experiences (e.g., websites or apps)
- Increase customer satisfaction and loyalty
- Reduce churn (losing customers)

### **4. Content Marketing & Brand Identity:**

Netflix produces original content that strengthens its brand.

#### **Benefit to a business:**

A business can create its own valuable content (videos, blogs, tutorials) to:

- Build trust
- Educate customers
- Stand out from competitors

### **5. Subscription Model Inspiration:**

Netflix operates on a monthly subscription model, generating recurring revenue.

#### **Benefit to a business:**

Many industries (e.g., software, fitness, even food) now offer subscriptions. A business can:

- Ensure steady income
- Improve customer retention
- Predict revenue more easily

#### **Summary:**

Netflix can benefit a business indirectly as a role model for:

- Using cloud technology
- Personalizing user experiences
- Leveraging data
- Building strong brand content
- Creating a scalable revenue model



## What's the alternative to cloud computing?

### 1. On-Premises Computing (Main Alternative)

- You buy and own your own servers and computers.
- All data and software are stored at your location (office or building).
- You are responsible for updates, security, and maintenance.
- Higher upfront cost, but full control.

### 2. Hybrid Computing

- A mix of cloud and on-premises.
- You keep sensitive data on-site and use the cloud for less critical tasks.
- More flexible and secure in some cases.

### 3. Edge Computing

- Data is processed close to where it's created (e.g., in a smart device).
- Useful for fast, real-time processing (like in cars, cameras, or machines).
- Reduces delay compared to sending data to the cloud.

### 4. Colocation (Data Center Hosting)

- You place your own servers in someone else's data centre.
- You manage the servers, but they provide power, cooling, and internet.



- A middle ground between cloud and on-premises.

## 1. Amazon Web Services (AWS)

Provider: Amazon

Type: Public Cloud

 **Key Features:** • Compute: EC2 (virtual servers), Lambda (serverless computing) • Storage: S3 (object storage), EBS (block storage) • Databases: RDS (SQL), DynamoDB (NoSQL) • AI/ML: SageMaker • Security: IAM, Shield (DDoS protection)

 **Functions:** • Web and mobile app hosting • Big data processing • Video streaming (e.g., Netflix) • AI/ML model training • Scalable storage solutions

## 2. Microsoft Azure

Provider: Microsoft

Type: Public + Hybrid Cloud (Azure Arc, Stack)

 **Key Features:** • Compute: Azure Virtual Machines, App Services • Storage: Blob Storage, Disk Storage • Databases: Azure SQL, Cosmos DB • DevOps: Azure DevOps, GitHub Actions • Security: Azure Active Directory, Security Center

 **Functions:** • Enterprise and business applications • Hybrid cloud deployments • Integration with Microsoft products (e.g., Office 365) • IoT, machine learning, and analytics

## 3. Google Cloud Platform (GCP)

Provider: Google



Type: Public Cloud

 **Key Features:** • Compute: Compute Engine, Cloud Functions • Storage: Cloud Storage, Persistent Disks • Databases: Big Query (analytics), Fire store (NoSQL) • AI/ML: Vertex AI, TensorFlow support • Security: Identity & Access Management (IAM), Security Command Center

 **Functions:** • Data analytics and big data processing • Machine learning and AI solutions • Cloud-native app development • Scalable hosting for modern apps

#### 4. IBM Cloud

Provider: IBM

Type: Public + Private + Hybrid + Community Cloud

 **Key Features:** • Compute: Virtual Servers, Bare Metal Servers • Storage: Object Storage, Block Storage • AI/ML: Watson AI • Security: Data encryption, Key Protect • Cloud Paks: For data, AI, automation, integration

 **Functions:** • Enterprise-grade hybrid cloud • AI-driven business intelligence • Industry-specific solutions (finance, healthcare)

#### 5. Oracle Cloud Infrastructure (OCI)

Provider: Oracle

Type: Public + Hybrid Cloud

 **Key Features:** • Compute: VM and bare metal instances • Databases: Autonomous Database, Oracle DB • Storage: Block, Object, and Archive Storage • Security: Identity and access, data security • Developer Tools: Container engine for Kubernetes, DevOps integrations



 **Functions:** • Business-critical applications • Enterprise databases • High-performance computing (HPC)

## **6. Alibaba Cloud**

Provider: Alibaba

Group Type: Public Cloud (Popular in Asia)

 **Key Features:** • Compute: ECS (Elastic Compute Service) • Storage: OSS (Object Storage Service) • Databases: Apsara DB, Polar DB • AI/ML: Machine Learning Platform for AI • Security: Anti-DDoS, Cloud Firewall

 **Functions:** • E-commerce hosting (used by Alibaba) • AI, IoT, and big data tools • Cross-border cloud services

## Day 1: Task 2

Please research the below cloud offerings, explain what they are and examples of use cases.

**Cloud Offerings**

**Explain what it is**

**When / how might you use this service in the real-world?**



<p><b>IaaS (Infrastructure as a service)</b></p>	<p><b>IaaS (Infrastructure as a Service)</b> is a cloud computing service model that provides virtualized computing resources over the internet. Instead of buying and maintaining physical servers, networking equipment, or data centres, users can rent infrastructure on demand from a cloud provider (like AWS, Microsoft Azure, or Google Cloud).</p> <p><b>What Does IaaS Include?</b></p> <ul style="list-style-type: none"> <li>• <b>Virtual Machines (VMs):</b> Servers you can configure with your choice of OS, memory, storage, etc.</li> <li>• <b>Storage:</b> Scalable storage solutions (block, file, or object storage).</li> <li>• <b>Networking:</b> Firewalls, load balancers, IP addresses, VPNs.</li> <li>• <b>Other Resources:</b> Backup and disaster recovery, monitoring tools, security controls.</li> </ul>	<p><b>Hosting a Website or Application</b></p> <ul style="list-style-type: none"> <li>• Use Case: You're launching a web application.</li> <li>• Why IaaS: You don't want to invest in physical servers. Instead, rent a virtual server and scale it as your user base grows.</li> <li>• Example: Use Azure Virtual Machines or AWS EC2 to deploy your app backend.</li> </ul> <p><b>2. Development &amp; Testing Environments</b></p> <ul style="list-style-type: none"> <li>• Use Case: You're building software and need to test it on multiple platforms.</li> <li>• Why IaaS: You can quickly spin up different environments (e.g., Windows, Linux) without needing local hardware.</li> <li>• Example: QA teams use multiple VMs to test applications across OS versions.</li> </ul> <p><b>3. Disaster Recovery &amp; Backup</b></p> <ul style="list-style-type: none"> <li>• Use Case: Your local servers crash or your office suffers a power outage.</li> <li>• Why IaaS: You can instantly recover data or switch to cloud-hosted infrastructure.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Example: Use IaaS to mirror your production environment for high availability.</li> </ul> <p><b>4. Big Data Analysis</b></p> <ul style="list-style-type: none"> <li>• Use Case: You're analysing large datasets (e.g., logs, customer data).</li> <li>• Why IaaS: Quickly scale compute and storage to handle intensive processing.</li> <li>• Example: Use Google Cloud's infrastructure to run Hadoop or Spark clusters.</li> </ul> <p><b>5. Running Legacy Applications</b></p> <ul style="list-style-type: none"> <li>• Use Case: You have old applications that run on outdated OS versions.</li> <li>• Why IaaS: You can create a custom VM image with your specific setup without buying outdated hardware.</li> <li>• Example: Host an old accounting system on a custom VM in the cloud.</li> </ul>
<b>PaaS (Platform as a service)</b>	<p>PaaS (Platform as a Service) is a cloud service that provides a platform to build, run, and manage applications without</p> <p><b>Developing Web or Mobile Apps</b></p> <ul style="list-style-type: none"> <li>• Why PaaS: You don't want to manage servers or databases.</li> <li>• Example: Use Google App Engine or Azure App Service to</li> </ul>



	<p>worrying about the underlying infrastructure (like servers, storage, or networking).</p> <p>In Simple Terms:</p> <p>You focus on coding and deploying, and the provider handles everything else (OS, updates, scaling, etc.).</p>	<p>deploy your app with just your code.</p> <p><input checked="" type="checkbox"/> <b>Collaborative Software Projects</b></p> <ul style="list-style-type: none"> <li>• Why PaaS: Developers can work on the same app using built-in tools.</li> <li>• Example: Teams use Heroku to build and deploy projects quickly.</li> </ul> <p><input checked="" type="checkbox"/> <b>APIs and Microservices</b></p> <ul style="list-style-type: none"> <li>• Why PaaS: Easy to scale and manage multiple small services.</li> <li>• Example: Use AWS Elastic Beanstalk to deploy APIs with automatic load balancing and scaling.</li> </ul> <p><input checked="" type="checkbox"/> <b>Database Hosting</b></p> <ul style="list-style-type: none"> <li>• Why PaaS: Get managed databases without setup or maintenance.</li> <li>• Example: Use Azure SQL Database or Firebase for hosted, scalable databases.</li> </ul> <p><b>Why Use PaaS?</b></p> <ul style="list-style-type: none"> <li>• No need to manage servers</li> <li>• Faster development and deployment</li> <li>• Scalable and cost-effective</li> <li>• Built-in tools for monitoring, testing, and updates</li> </ul>
<b>SaaS (Software as a service)</b>	<b>SaaS (Software as a Service)</b> is a cloud service that lets you use software over the internet—no installation,	<input checked="" type="checkbox"/> <b>Email &amp; Communication</b> <ul style="list-style-type: none"> <li>• Example: Gmail, Outlook, Microsoft Teams</li> </ul>



	<p>no servers, no maintenance needed.</p> <p>In Simple Terms:</p> <p>You just log in and use the software. The provider handles everything: infrastructure, updates, security, and backups.</p>	<ul style="list-style-type: none"> <li>• Why SaaS: Access email and chat from anywhere without setup.</li> </ul> <p><input checked="" type="checkbox"/> <b>Office Tools</b></p> <ul style="list-style-type: none"> <li>• Example: Google Workspace, Microsoft 365</li> <li>• Why SaaS: Create and share documents, spreadsheets, and presentations online.</li> </ul> <p><input checked="" type="checkbox"/> <b>Customer Management</b></p> <ul style="list-style-type: none"> <li>• Example: Salesforce, HubSpot</li> <li>• Why SaaS: Manage customer data and sales pipelines easily in the cloud.</li> </ul> <p><input checked="" type="checkbox"/> <b>Accounting &amp; Invoicing</b></p> <ul style="list-style-type: none"> <li>• Example: QuickBooks Online, Xero</li> <li>• Why SaaS: Handle finances without installing anything on your computer.</li> </ul> <p><input checked="" type="checkbox"/> <b>Online Storage</b></p> <ul style="list-style-type: none"> <li>• Example: Dropbox, Google Drive</li> <li>• Why SaaS: Store and access files securely from any device.</li> </ul> <p><b>Why Use SaaS?</b></p> <ul style="list-style-type: none"> <li>• Easy to use and set up</li> <li>• Accessible from any device with internet <ul style="list-style-type: none"> <li>• Automatic updates and backups</li> <li>• Scales with your needs</li> </ul> </li> </ul>
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## Day 1: Task 3

Please research the below terms and explain what they are, when they would be appropriate and a real-world example of where it could be implemented (i.e. what type of organisation).

### Public Cloud

A public cloud is a cloud service provided by third-party companies (like AWS, Azure, or Google Cloud) that anyone can use over the internet. It offers scalable, pay-as-you-go access to computing resources like storage and servers.

#### **Real-World Example:**

Netflix uses Amazon Web Services (AWS) to stream movies and shows to millions of users. AWS provides the infrastructure, so Netflix doesn't need to own or manage physical servers.

### Private Cloud

A private cloud is a cloud environment used exclusively by one organization. It can be hosted on-premises or by a third party but is not shared with other customers. It offers more control, security, and customization.

#### **Real-World Example:**

Bank of America uses a private cloud to store and process sensitive financial data securely. This setup ensures strict data privacy and compliance with financial regulations.

### Hybrid Cloud

A hybrid cloud combines public and private cloud environments, allowing data and applications to move



## Community Cloud

between them. It offers flexibility, scalability, and better control over sensitive data.

### Real-World Example:

IBM uses a hybrid cloud model for clients like Walmart, where sensitive customer data is kept on a private cloud, while less sensitive operations (like running apps) use the public cloud. This ensures security without sacrificing scalability.

A community cloud is a cloud infrastructure shared by several organizations with similar needs (e.g., security, compliance, mission). It is jointly managed or hosted by a third party and supports a specific community.

### Real-World Example:

U.S. government agencies (like the Department of Defense and NASA) use a community cloud hosted by providers like GovCloud (by AWS). It meets strict government security and compliance requirements while being shared among federal organizations.

## Day 2: Task 1



Describe, with examples, the **three** major areas that the Computer Misuse Act deals with.

Area	Description	Example
<b>Unauthorized Access to Computer Material (Section 1)</b>	This involves accessing a computer system or data without permission — commonly known as hacking.	<p>A student guesses their teacher's login password and reads private emails without permission.</p> <p>Offence: Even if no data is changed or stolen, just accessing it without permission is a crime.</p>
<b>Unauthorized Access with Intent to Commit or Facilitate a Crime (Section 2)</b>	<p><b>What it means:</b> Accessing a computer system without permission with the intent to commit a further crime (like fraud, theft, or blackmail).</p>	<p>A hacker breaking into a bank's computer system intending to transfer money to their own account.</p> <p>Someone accessing a customer database to steal credit card details for fraud.</p> <p><b>Key point:</b> There must be intent to commit or help commit another crime.</p>
<b>Unauthorized Modification of Computer Material (Section 3)</b>	<p><b>What it means:</b> Altering, deleting, or corrupting data or software without permission.</p>	<ul style="list-style-type: none"> <li>• A disgruntled employee deleting files from a company server.</li> <li>• A hacker deploying a virus or ransomware to damage systems.</li> </ul> <p><b>Key point:</b> This covers any act that intentionally changes or destroys data without permission.</p>

The computer misuse act 1990 is an act where an individual can be criminalised because of computer



related offense. Describe three extra powers that the Police and Justice Act 2006 (Computer Misuse) has added.

Description
<p>The Computer Misuse Act 1990 is a law that makes it a criminal offence for individuals to misuse computer systems, such as by accessing them without permission or causing damage to data. Later, the Police and Justice Act 2006 strengthened this law by giving authorities more power and introducing stricter penalties for serious computer-related crimes, such as denial-of-service (DoS) attacks and organized cybercrime.</p>
<p><b>Key Additions from the Police and Justice Act 2006:</b></p> <ul style="list-style-type: none"><li>• Increased penalties for serious offences (e.g. up to 10 years for some).</li><li>• New offence introduced for “making, supplying or obtaining” tools used for hacking.</li><li>• DoS attacks (overloading systems) specifically made illegal.</li></ul>

Look at the below website to answer the questions:  
<https://www.gov.uk/personal-data-my-employer-can-keep-about-me>

**Write down three items of data which a company can store about an employee.**

**Here are three items of data a company can store about an employee:**

1. Employee's full name
2. Job title and department
3. Salary or wage information



**Give three more examples of data that an employer can only store if they first get the employee's permission.**

Here are three examples of data that an employer can only store with the employee's explicit permission (often due to privacy or sensitivity):

1. Medical or health information – e.g., details about a disability or medical condition.
2. Biometric data – e.g., fingerprints or facial recognition used for security or attendance.
3. Religious beliefs or political opinions – if relevant to accommodations or diversity data.

These types of data are considered sensitive personal data under laws like the UK GDPR and require clear consent before being collected or stored.

Conduct further research to answer the below questions.



Question	Answer
<b>Provide one example of: Copyright infringement</b>	<p>If someone copies and reposts an entire popular song's lyrics on their blog without permission from the copyright owner, that is copyright infringement.</p> <p>They are using protected creative content without authorization, violating the rights of the original creator.</p>
<b>Provide one example of: Plagiarism</b>	<p>A student copies several paragraphs from a website or book and includes them in their school essay without quoting or citing the original source.</p> <p>They present someone else's words or ideas as their own, which is plagiarism.</p>
<b>What are two consequences of copyright infringement and software piracy?</b>	<p>Here are two common consequences for copyright infringement and software piracy:</p> <ol style="list-style-type: none"> <li>1. <b>Legal Consequences:</b> <ul style="list-style-type: none"> <li>• Fines and penalties — individuals or companies caught can face costly lawsuits, statutory damages, or even criminal charges depending on severity.</li> <li>• Possible jail time in severe or repeated cases.</li> </ul> </li> <li>2. <b>Financial Consequences:</b> <ul style="list-style-type: none"> <li>• Loss of revenue for the copyright owner or software developer, which can also affect the infringer if they lose business or must pay damages.</li> <li>• Costs related to legal defence, settlements, or purchasing legitimate licenses after being caught.</li> </ul> </li> </ol>



<p><b>Give three possible consequences for individuals when using pirated software</b></p>	<p>Here are three possible consequences for individuals using pirated software:</p> <ol style="list-style-type: none"> <li>1. <b>Legal Trouble:</b> They could face fines or even criminal charges for using software without a valid license.</li> <li>2. <b>Security Risks:</b> Pirated software often contains malware, viruses, or spyware that can compromise personal data and privacy.</li> <li>3. <b>Lack of Support and Updates:</b> Users won't get official software updates, patches, or customer support, which can lead to bugs, crashes, and vulnerabilities.</li> </ol>
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Listed below are some laws which we have covered today:

1. Computer Misuse Act 1990
2. Police and Justice Act 2006 (Computer Misuse)
3. Copyright, Designs and Patents Act 1988
4. Copyright (Computer Programs) Regulations 1992
5. The Health and Safety (Display Screen Equipment) Regulations 1992
6. Data Protection Act 2018
7. Consumer Rights Act 2015

- Insert a number in the first column of each row to match each of the statements with one of the above Acts.



- One of statements is incorrect and not illegal. For this statement, write 'Not illegal'.

<b>Act number</b>	<b>Clause</b>
4	With some exceptions, it is illegal to use unlicensed software
7	Any product, digital or otherwise, must be fit for the purpose it is supplied for
1	Unauthorised modification of computer material is illegal
1	It is illegal to create or use a hacking tool for penetration testing
6	Personal data may only be used for specified, explicit purposes
5	Employers must provide their computer users with adequate health and safety training for any workstation they work at
2	It is illegal to distribute hacking tools for criminal purposes
	It is illegal to distribute an illicit recording
6	Personal data may not be kept longer than necessary
1	Gaining unauthorised access to a computer system is illegal
5	Employers must ensure that employees take regular and adequate breaks from looking at their screens
1	It is illegal to prevent or hinder access (e.g. by a denial-of-service attack) to any program or data held in any computer
6	Personal data must be accurate and where necessary kept up to date

### Day 3: Task 1

Please complete the below lab (3) '*Explore relational data in Azure*' and paste evidence of the completed lab in the box provided.





# Explore relational data in Azure

Learning Path 02 (CSS)

Duration:	2 Hours, 15 Minutes
Lab Series:	DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided]
Virtualization Platform:	Hyper-V
RAM:	6.5GB
Cloud Platform:	Azure
Content Version:	2
Is Exam:	No
Status:	Not Running

**Launch**

**Completed lab**



## Day 3: Task 2

Please complete the below lab (4) '*Explore non-relational data in Azure*' and paste evidence of the completed lab in the box provided.



### Explore non-relational data in Azure

Learning Path 03 (CSS)

Duration:	2 Hours, 15 Minutes
Lab Series:	DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided]
Virtualization Platform:	Hyper-V
RAM:	6.5GB
Cloud Platform:	Azure
Content Version:	2
Is Exam:	No
Status:	Not Running

Launch



# Completed lab

The screenshot shows two windows side-by-side. The left window displays the Microsoft Azure Storage account overview for 'red123'. It includes details like Resource group (move), Location (eastus), Subscription (move), and Disk state (Available). The right window shows the 'Explore non-relational data in Azure' lab guide, step 7, which involves creating a blob storage container. Below these, another Microsoft Edge window shows the 'Storage browser' for 'laibash124', displaying a table with one row added ('Successfully updated entity'). A detailed table of properties for the 'products' table is shown on the right.

**Explore non-relational data in Azure**  
1 Hr 49 Min Remaining

Instructions Resources Help  100%

then select **Next: Networking** > and then in the **Recovery** section, deselect all of the **Enable soft delete...** options. These options retain deleted files for subsequent recovery, but can cause issues later when you enable hierarchical namespace.

5. Select **Next: Data protection** > and then in the **Recovery** section, deselect all of the **Enable soft delete...** options. These options retain deleted files for subsequent recovery, but can cause issues later when you enable hierarchical namespace.

6. Continue through the remaining **Next >** pages without changing any of the default settings, and then on the **Review** page, wait for your selections to be validated and select **Create** to create your Azure Storage account.

7. Wait for deployment to complete. Then go to the resource that was deployed.

**Explore blob storage**

Now that you have an Azure Storage account, you can create a container for blob data.

1. Download the `product1.json` JSON file from <https://aka.ms/product1.json> and save

Next >

**Explore non-relational data in Azure**  
1 Hr 34 Min Remaining

Instructions Resources Help  100%

10. Select **Insert** to insert a row for the new entity into the table.

11. In storage browser, verify that a row has been added to the **products** table, and that a **Timestamp** column has been created to indicate when the row was last modified.

12. Add another entity to the **products** table with the following properties:

Property name	Type	Value
PartitionKey	String	1
RowKey	String	2
Name	String	Kniknak
Price	Double	1.99
Discontinued	Boolean	true

13. After inserting the new entity, verify that a row has been added to the **products** table, and that a **Timestamp** column has been created to indicate when the row was last modified.

Go to Settings to activate Windows

Next >



Explore non-relational data in Azure - Personal - Microsoft Edge

https://labclient.labondemand.com/LabClient/652e34aa-a5b5-49c5-b335-d4c75b2bc373

Microsoft Azure | Data Explorer

Home > laiba12

laiba12 | Data Explorer

Azure Cosmos DB account

SampleDB

SampleContainer

Items

Scale & Settings

Stored Procedures

User Defined Functions

New Container

Home

Sample\_Items

SELECT \* FROM c

Type a query predicate (e.g., WHERE cid=1), or choose one from the drop down list, or

Apply Filter

	id	...	equity
1	"id": "3FE1A99E-DE14-4011-B635-F5D39258A0B9",		
2	"categoryId": "26C7A104-408C-4541-BEF5-9892F7F		
3	"categoryName": "Components, Saddles",		
4	"sku": "SE-T924",		
5	"name": "HL Touring Seat/Saddle",		
6	"description": "The product called 'HL Tourin		
7	"price": 52.64,		
8	"tags": [		
9			
10			
11			
12			
13			

Load more

0 2 0 0 0 0 |

72°F Mostly sunny

Search

ENG US

6:53 AM 6/16/2025

Activate Windows

Previous End >

2:53 PM 6/16/2025

Activate Windows

Go to Settings to activate Windows.

72°F Mostly sunny

Search

ENG US

2:56 PM 6/16/2025

Activate Windows

Previous End >

2:56 PM 6/16/2025

Are you sure you want to end this lab?

Yes, end my lab No, not yet



## Day 3: Task 3

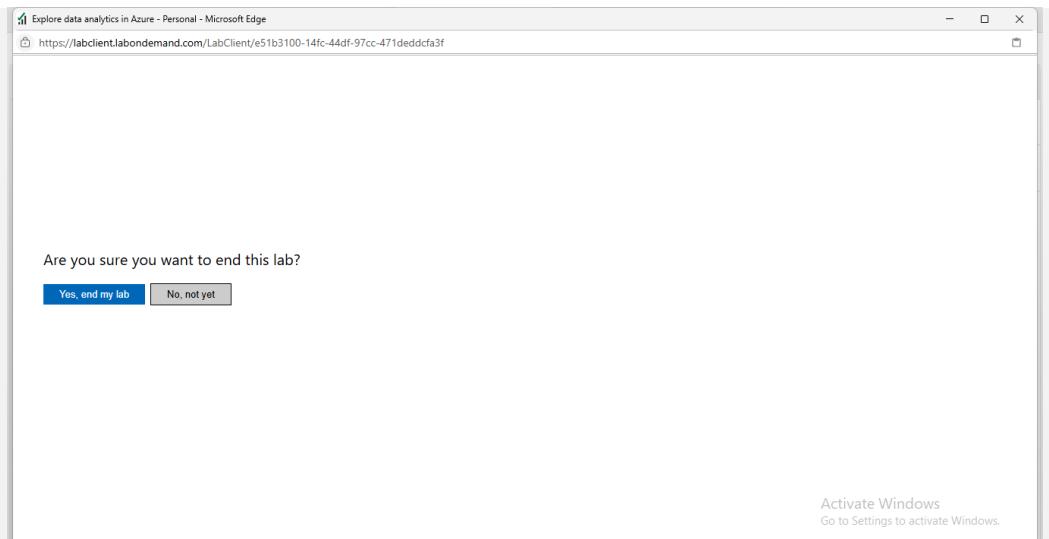
Please complete the below lab (5) 'Explore data analytics in Azure' and paste evidence of the completed lab in the box provided.

 Explore data analytics in Azure

Learning Path 04 (CSS)

Duration:	3 Hours
Lab Series:	DP-900T00-A Microsoft Azure Data Fundamentals [Cloud Slice Provided]
Virtualization Platform:	Hyper-V
RAM:	6.5GB
Cloud Platform:	Azure
Content Version:	2
Is Exam:	No
Status:	Not Running

[Launch](#)



**Completed lab**

Activate Windows  
Go to Settings to activate Windows.

75°F Sunny

Search

4:14 PM 6/17/2025



## Day 4: Task 1

In your teams, complete the Azure DP-900 practice exam and paste your result below – this is open book and please research and discuss your answers as a team.

The screenshot shows a Microsoft Learn page for a practice assessment. On the left, a green sidebar displays a large number '6' and a link icon. The main content area shows the following details:

**Practice Assessment: DP-900T00-A Microsoft Azure Data Fundamentals**  
Practice Assessment for Microsoft Certifications for DP-900T00-A

**Additional Details**

- Required: No
- Available Instructor-Led: Yes
- Available Self-Paced: Yes

**Result**

Your practice assessment results | Microsoft Learn - Personal - Microsoft Edge  
https://learn.microsoft.com/en-us/credentials/certifications/azure-data-fundamentals/practice/results?assessmentId=24&practice-assessment-type=certification&snapshotId=6f2f89a5-9222-447e-a965-f30c15dd...

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**Practice Assessment Results: June 12, 2025**

**Microsoft EXAM**  
Practice Assessment for Exam DP-900: Microsoft Azure Data Fundamentals

It took you 42 minutes to complete this assessment.

**Overall Results**

To be better prepared for the exam, aim to achieve a score of 80% or higher in multiple attempts.

Score: 90%

Show My Answers

Activate Windows  
Go to Settings to activate Windows.

70°F Heavy rain

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## Day 4: Task 2

### ***1. Scenario Background***

"Paws & Whiskers" is a growing pet shop that aims to improve its business by analysing sales, customer information, and inventory data. Currently, the data is collected manually or stored in spreadsheets. Management is interested in transitioning to Microsoft Azure to streamline data storage, analysis, and reporting, enabling them to make data-driven decisions.

### ***2. Data Laws and Regulations***

Identify and explain the data laws and regulations relevant to handling customer data within the proposal. Ensure you cover the following points:



- **GDPR Compliance:** Highlight the importance of adhering to the General Data Protection Regulation (GDPR), particularly as it relates to storing and processing customer information.
- **Data Protection Act (DPA) 2018:** Outline how the DPA 2018 may affect the way "Paws & Whiskers" collects and stores data, ensuring compliance with UK laws on data privacy.
- **Other Industry Standards:** Research any additional data protection standards or regulations that may apply to pet shop data, particularly if they involve sensitive or payment information.

### **3. Azure Service Recommendations**

Recommend Microsoft Azure services that would suit the company's data analysis needs and explain why these services are suitable. Your recommendations should include:

- **Data Storage:** Identify suitable storage options, such as **Azure Blob Storage** or **Azure SQL Database**, and discuss the benefits of each for storing large datasets, including inventory, sales transactions, and customer details.
- **Data Analysis Tools:** Recommend tools such as **Azure Machine Learning** for customer behaviour analysis or **Azure Synapse Analytics** for analysing sales trends.
- **Data Integration and Automation:** Explain how services like **Azure Data Factory** could automate data collection and integration processes, improving efficiency.

### **4. Data Types and Data Modelling**

Define the types of data "Paws & Whiskers" will need to work with and describe your approach to data modelling:

- **Data Categories:** Identify key data types, such as customer demographics, transaction history, pet inventory, and product categories.
- **Data Modelling Approach:** Outline how you would structure this data using a relational model or a data warehouse approach, considering factors like tables, entities, relationships, and primary keys.

### **5. Data Storage Formats and Structures in Azure**

Discuss how you would store data within Azure and the formats you would recommend:

- **Data Formats:** Specify recommended formats (e.g., CSV for raw data imports, JSON for structured data, Parquet for analytics) and explain why these formats are suitable for specific data types.
- **Data Security and Encryption:** Include recommendations for securing data using Azure's built-in encryption features and access controls to ensure compliance with data privacy regulations.



## 6. Additional Considerations

Provide any other considerations that might enhance data handling and efficiency in Azure, such as:

- **Backup and Disaster Recovery:** Outline a backup plan using **Azure Backup** or **Azure Site Recovery** to safeguard against data loss.
- **Data Visualisation:** Discuss potential use of **Power BI** within Azure for creating dashboards that provide management with real-time insights into sales and customer trends.
- **Future Scalability:** Comment on how Azure services can scale as the business grows, accommodating larger datasets and more complex analyses.

## Submission Guidelines:

1. **Structure:** Ensure your report is well-organised, with sections for each task (e.g., Data Laws, Azure Services, Data Types, etc.).
2. **Formatting:** Include headings, bullet points where appropriate, and any visuals or diagrams that support your explanations.
3. **References:** Cite any resources or regulations referenced in the report.
4. **Length:** Aim for 1500-2000 words.

Here's a detailed explanation of the relevant data laws and regulations that Paws & Whiskers must consider when handling customer data as part of their transition to Microsoft Azure:

### 1. GDPR Compliance (General Data Protection Regulation)

The GDPR is a European Union regulation that governs how organizations collect, store, and process personal data of individuals within the EU and UK. Even post-Brexit, the UK has retained GDPR principles under the UK GDPR.

#### Key Requirements:

- Lawful Basis for Processing: Paws & Whiskers must have a clear reason (e.g., customer consent, contractual necessity) to collect and use customer data.
- Transparency & Consent: Customers must be informed about how their data will be used. This includes providing clear privacy notices and obtaining explicit consent for marketing or data sharing.
- Data Minimization: Only the data necessary for the intended purpose should be collected.
- Right to Access & Erasure: Customers have the right to request access to their data or ask for it to be deleted ("right to be forgotten").
- Data Security: All customer data must be securely stored. Microsoft Azure offers GDPR-compliant services that support encryption, access control, and monitoring.



- Data Breach Notification: Any data breach must be reported to the Information Commissioner's Office (ICO) within 72 hours if it poses a risk to individual rights.

## 2. Data Protection Act (DPA) 2018

The DPA 2018 supplements the GDPR in the UK and governs the use of personal data. It introduces additional provisions around:

- Children's Data: If Paws & Whiskers collects data from children (e.g., via online accounts), extra safeguards and parental consent mechanisms are required.
- Sensitive Data Handling: Although pet ownership data may not usually be considered sensitive, any financial, health-related (e.g., pet prescriptions), or demographic information may fall into this category.
- Accountability and Documentation: Businesses must demonstrate compliance through documentation, policies, and training. A Data Protection Officer (DPO) may be required depending on the scale of data processing.

### Practical Implications for Paws & Whiskers:

- Update privacy policies and terms of service in line with DPA 2018.
- Train staff in data handling best practices.
- Use Azure's compliance tools to manage data protection and reporting obligations.

## 3. Other Industry Standards and Regulations

While there are no industry-specific regulations exclusive to pet shops, the following may apply:

### PCI DSS (Payment Card Industry Data Security Standard)

If Paws & Whiskers processes credit or debit card payments (in-store or online), they must comply with PCI DSS, which governs secure handling of payment information.

#### Key Principles:

- Secure transmission and storage of cardholder data.
- Implement firewalls and antivirus protection.
- Restrict data access to authorized personnel only.

Azure provides PCI DSS-compliant services, making it easier for Paws & Whiskers to maintain secure payment systems.

### Consumer Protection Laws

Under UK consumer protection regulations, businesses must:

- Clearly inform customers about how their data will be used.
- Provide secure and transparent online transactions.
- Maintain accurate records of purchases and communication.



## Cyber Essentials

This is a UK government-backed scheme that sets out basic cybersecurity practices.

While not legally required, certification can:

- Reduce cyber risk.
- Build customer trust.
- Demonstrate good data stewardship.

## Azure Service Recommendations

### A. Data Storage

#### 1. Azure SQL Database

**Best for:** Structured data such as customer details, sales transactions, and inventory records.

**Benefits:** • Fully managed relational database with high availability and scalability. • Supports SQL queries and integrates seamlessly with reporting and analytics tools. • Built-in security features for data protection. • Great for storing normalized data (e.g., customer profiles, orders, inventory).

#### 2. Azure Blob Storage

**Best for:** Unstructured or semi-structured data such as CSV imports, receipts, customer-uploaded images (e.g., pet pictures), or raw data files.

**Benefits:** • Cost-effective for large-scale storage. • Supports multiple formats (CSV, JSON, images, logs). • Easily integrates with Azure Data Factory, Synapse, and Machine Learning.

#### Recommendation:

Use Azure SQL Database for structured, relational data (customer, sales, inventory) and Blob Storage for storing unstructured or raw data files.

### B. Data Analysis Tools

#### 1. Azure Synapse Analytics

**Best for:** Analysing large datasets, such as sales trends across time or product performance.

**Benefits:** • Combines big data and data warehousing.

- Integrates with Power BI for visual analytics.
- Supports querying data from both SQL and non-SQL sources.
- Handles petabytes of data efficiently.

#### 2. Azure Machine Learning



**Best for:** Predictive analytics and understanding customer behaviour.

**Benefits:** • Can be used to predict repeat purchases, customer churn, or suggest personalized product recommendations. • Supports Jupiter notebooks and prebuilt algorithms. • Integrates with Azure Data Factory for automation and deployment.

## C. Data Integration and Automation

### Azure Data Factory

**Best for:** Automating data ingestion, transformation, and loading (ETL processes).

- **Benefits:** • Schedule and automate data movement between on-premises spreadsheets, Blob Storage, and SQL Databases.
- Supports transformation of data before analysis.
- Connects with over 90 data sources, including Excel, REST APIs, and on-prem systems.

## Data Types and Data Modelling

### A. Data Categories

Category	Example
Customer Demographics	Name, age, address, email, pet ownership
Transaction History	Purchase date, product ID, quantity, payment method
Pet Inventory	Pet types, breed, age, price, availability
Product Categories	Food, toys, accessories, grooming supplies

### B. Data Modelling Approach

#### Relational Model (Using Azure SQL Database)

##### Entities and Relationships:

- Customers (CustomerID as PK)
- Products (ProductID as PK)
- Sales (TransactionID as PK; linked via CustomerID and ProductID)
- Inventory (ProductID, StockLevel)
- Pets (PetID, BreedID; linked to Inventory)
- Product Categories (CategoryID; linked to Products)

##### Example Relationships:

- One-to-many: One customer → Many transactions.
- Many-to-many (via junction table): Products ↔ Sales.

##### This structure:

- Maintains data integrity.
- Simplifies querying and reporting.
- Supports growth and complex analysis.



## 5. Data Storage Formats and Structures in Azure

### A. Recommended Data Formats

#### CSV (Comma-Separated Values)

- Best for importing/exporting raw data from spreadsheets.
- Easy to read, lightweight, and supported by most tools.
- Ideal for: Inventory updates, sales transaction logs, customer records.

#### JSON (JavaScript Object Notation)

- Suitable for semi-structured data, especially for API responses or user preferences.
- Human-readable and easy to parse.
- Ideal for: Customer profiles, product details with attributes, mobile app data exchange.

#### Parquet

- Columnar storage format optimized for analytics.
- Compressed and efficient for querying large datasets.
- Ideal for: Large-scale reporting, trend analysis, use in Azure Synapse Analytics.

### B. Data Security and Encryption

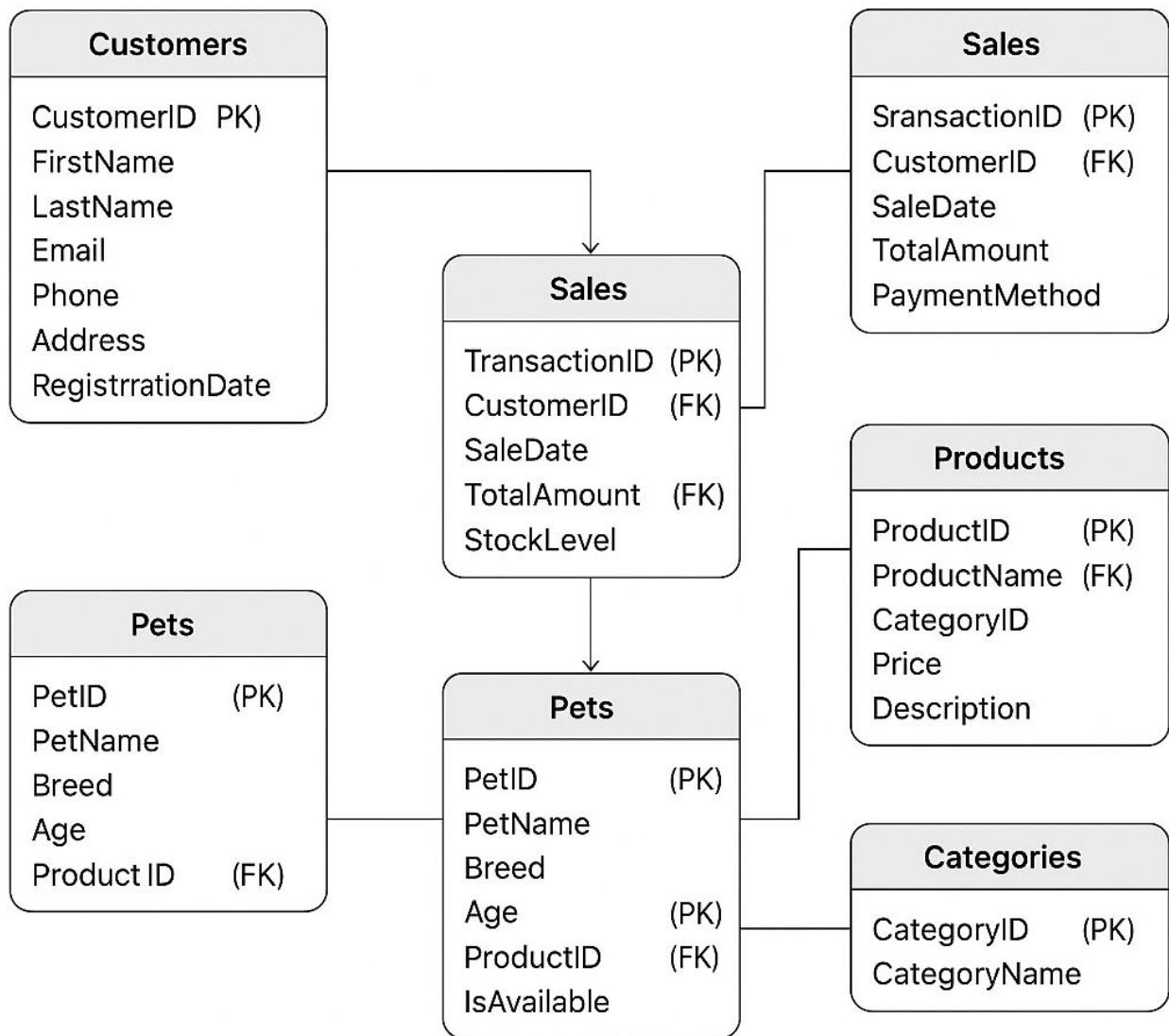
#### Azure Security Features to Use:

- Transparent Data Encryption (TDE): Encrypts SQL Database storage automatically.
- Azure Key Vault: Manages keys and secrets securely (e.g., API keys, encryption keys).
- Role-Based Access Control (RBAC): Limits data access based on user roles.
- Private Endpoints & Virtual Networks: Restricts network access to services.
- Advanced Threat Protection: Alerts on unusual activities or potential breaches.

#### Compliance:

All these tools help ensure compliance with GDPR, DPA 2018, and PCI DSS by protecting personal and payment-related information.





## Additional Considerations

### Backup and Disaster Recovery

#### A. Azure Backup

- A reliable and automated backup solution for Azure SQL Databases, VMs, and file systems. **Features:** • Point-in-time restore for databases (up to 35 days). • Geo-redundant storage to protect against regional failures. • Incremental backups to reduce storage costs. • **Recommendation:** • Schedule daily backups of SQL Databases and Blob Storage containers. • Retain backups for at least 30 days for compliance and recovery.



**B. Azure Site Recovery** • Enables business continuity in case of system failures or disasters. • **Use Case:** If Paws & Whiskers hosts any mission-critical services (e.g. customer portals or payment systems), Site Recovery can replicate the system to a secondary Azure region for fast recovery.

## Data Visualisation

Power BI (Integrated with Azure) • A powerful tool for building real-time dashboards and interactive reports. • Can connect directly to Azure SQL Database, Synapse Analytics, and Blob Storage. **Benefits:** • View real-time sales trends, top-selling products, inventory alerts. • Track customer behaviour, including repeat visits and spending habits. • Share dashboards securely with managers or store staff.

### Use Case Examples:

- Dashboard 1: Daily Sales & Revenue by Category
- Dashboard 2: Inventory Low Stock Alerts
- Dashboard 3: Customer Retention Trends

## Future Scalability

### How Azure Supports Growth:

**Elastic Storage Growth** • Azure Blob Storage and Azure SQL Database scale automatically with increasing data volumes.

## Scalable Compute Resources

- Virtual Machines, Azure Functions, and Synapse Analytics can scale vertically (more power) or horizontally (more instances) as workload demands grow.

## Big Data & Advanced Analytics

- Azure Synapse Analytics supports petabyte-scale data processing and complex analytical queries.

## AI and Machine Learning Expansion

- Azure Machine Learning allows model training and deployment at scale with support for GPU acceleration and distributed computing.

## Multi-Branch Data Integration

- Easily connect new store locations or e-commerce platforms using Azure Data Factory and centralized data storage.

## Auto-Scaling for Web & Mobile Apps



- If the business launches a website or app, Azure App Services can automatically scale to handle user traffic.

## Global Reach with Azure Regions

- Data and services can be replicated across multiple regions to support national or international expansion.

## Modular Architecture

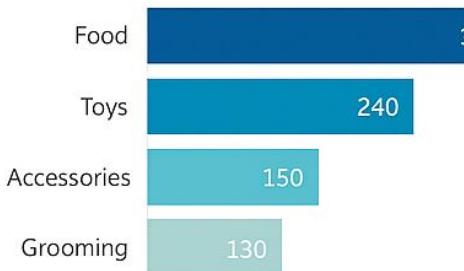
- Microservices and containerization (using Azure Kubernetes Service) allow for flexible growth without reworking the entire system.

# Pet Store Sales and Customer Trends

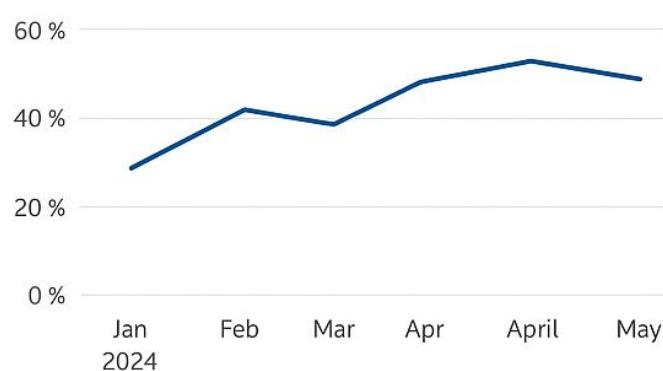
Daily Sales & Revenue by Category



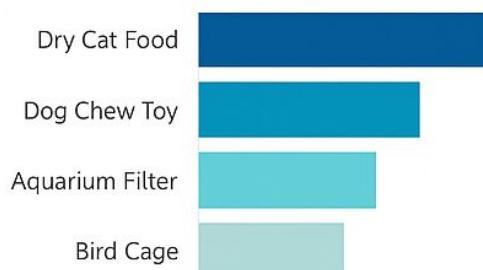
Sales by Product Category

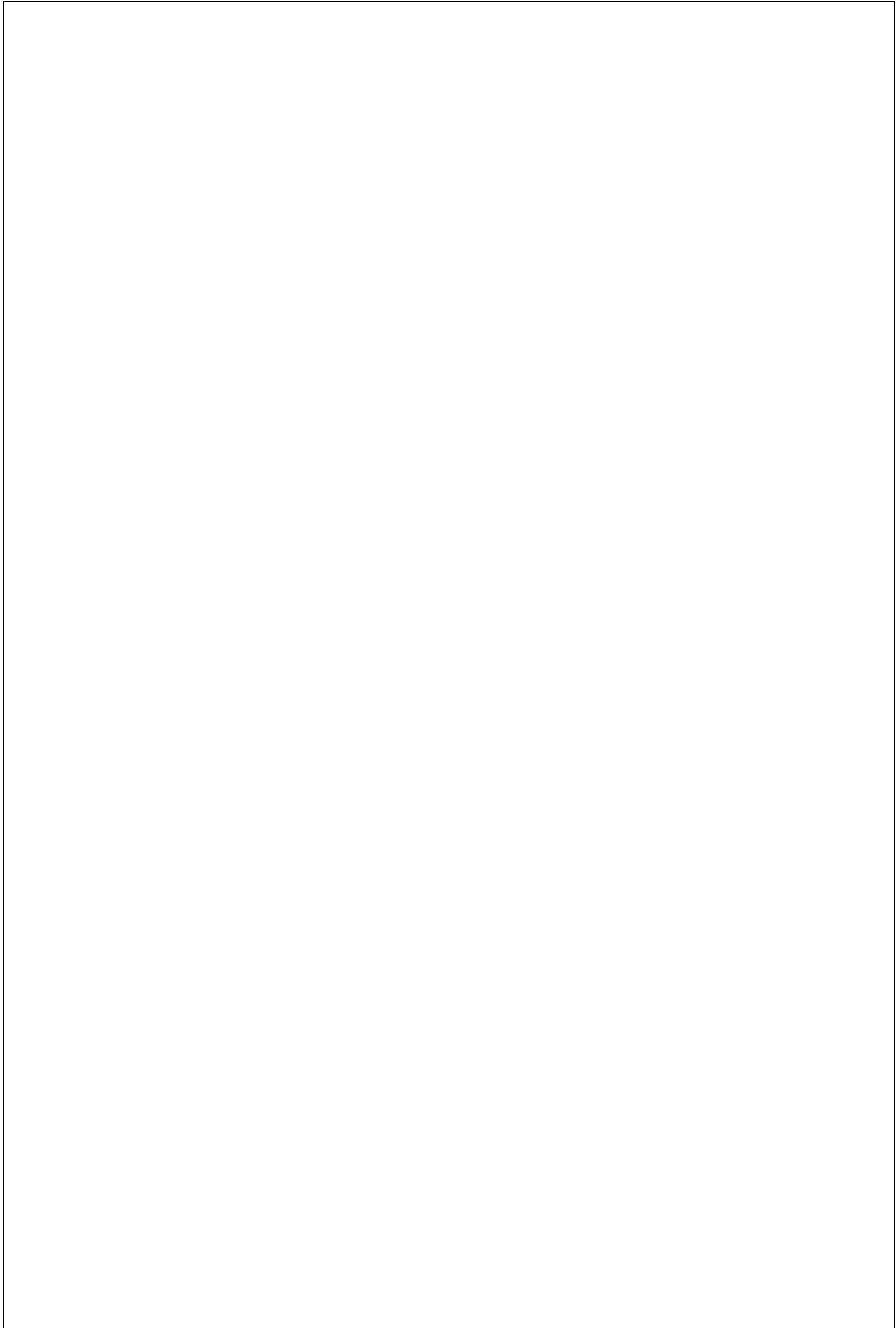


Customer Retention by Month



Top Selling Products







## Course Notes

It is recommended to take notes from the course, use the space below to do so, or use the revision guide shared with the class:



We have included a range of additional links to further resources and information that you may find useful, these can be found within your revision guide.

## **END OF WORKBOOK**

**Please check through your work thoroughly before submitting and update the table of contents if required.**

**Please send your completed work booklet to your trainer.**

