1. **What is Power BI, and what are its three main components?**

Power BI is a business analytics service by Microsoft that provides interactive visualizations and business intelligence capabilities with an interface simple enough for end users to create their own reports and dashboards.Its three main components are:

1. **Power BI Desktop:** A free Windows application for building and designing reports. It's the primary authoring tool where you connect to data, transform it, and create visualizations.
2. **Power BI Service:** The online, cloud-based service (SaaS) where you publish, share, and collaborate on reports and dashboards. It's also known as Power BI Online.
3. **Power BI Mobile:** The mobile app (for iOS, Android, and Windows) for viewing reports and dashboards on the go.

2. **Name two business use cases for Power BI dashboards.**

Sales Performance Monitoring: A dashboard can show real-time key metrics like total revenue, sales by region, progress towards quarterly targets, and performance of individual sales reps, allowing managers to make quick, data-driven decisions.

Operational Efficiency Tracking: A manufacturing company can use a dashboard to monitor production line output, machine downtime, inventory levels, and order fulfillment rates, helping to identify bottlenecks and improve operational efficiency.

3. **How do you download and install Power BI Desktop?**

1. Go to the official [Power BI Desktop download page].
2. Click the "Download Free" button.
3. Run the downloaded installer file (PBIDesktopSetup.exe).
4. Follow the on-screen installation instructions. It's a straightforward process similar to installing any other Windows application.

4. **What is the difference between Power BI Desktop and Power BI Service?**

Feature	Power BI Desktop	Power BI Service
Purpose	Report Authoring & Development	Report Consumption, Sharing & Collaboration
Deployment	Windows Desktop Application	Cloud-based Web Service (SaaS)
Data Modeling	Full capabilities (Power Query, DAX, relationships)	Limited capabilities (can create calculated columns, not measures)
Data Sources	Connect to a wide variety of sources (local files, databases, etc.)	Primarily connects to datasets published from Desktop or cloud services
Cost	Free	Free with limited sharing; full collaboration requires a Pro or Premium license

5. **What file extension does a Power BI project use?**

A Power BI project file uses the `.pbix` extension.

6. **Explain the role of Power Query in Power BI.**

Power Query is the data connectivity and preparation engine within Power BI Desktop. Its primary role is to **Extract, Transform, and Load (ETL)** data. It allows you to:

- **Connect** to various data sources (Excel, SQL Server, web APIs, etc.).
- **Clean and Transform** data (e.g., remove duplicates, change data types, pivot/unpivot columns, merge tables).
- **Load** the cleaned data into the Power BI model for further analysis and visualization.

7. Why would a business prefer Power BI over Excel for reporting?

While Excel is powerful, businesses prefer Power BI for:

- **Handling Larger Datasets:** Power BI can handle millions of rows more efficiently than Excel.
- **Interactive Visualizations:** Power BI reports are inherently interactive, allowing users to slice and filter data with clicks, which is more complex to set up in Excel.
- **Centralized Data Model:** Power BI has a robust in-memory data model (VertiPaq) optimized for fast querying.
- **Better Sharing & Collaboration:** Power BI Service provides a centralized portal for sharing and collaborating on live, up-to-date reports, unlike sharing static Excel files via email.

8. Describe one limitation of the free version of Power BI.

The most significant limitation of the free Power BI license (within the Power BI Service) is that **you can only share reports and dashboards with other users who also have a Pro license**. You cannot publish to a wide audience or embed reports in public websites without upgrading to a Premium capacity.

9. What is a "published report" in Power BI Service?

A "published report" is a .pbix file that has been uploaded from **Power BI Desktop** to the **Power BI Service**. Once published, the report becomes available online, where it can be shared with colleagues, pinned to dashboards, and accessed via the web or mobile apps.

10. How does Power BI Mobile enhance accessibility?

The Power BI Mobile app provides on-the-go access to reports and dashboards from anywhere, on any device (phones and tablets). It enhances accessibility through:

- **Touch-Optimized Views:** Reports are automatically formatted for mobile screens.
- **Offline Access:** Users can view critical reports even without an internet connection.
- **Mobile-Specific Alerts:** Users can set up data-driven alerts to be notified on their phone when metrics cross a threshold.

11. Compare Power BI with Tableau—pros and cons.

Aspect	Power BI	Tableau
Pros	- **Cost-Effective:** Lower total cost of ownership. - **Deep Microsoft Integration:** Seamless with Azure, Office 365, SharePoint. - **Ease of Use:** Gentler learning curve for business users. - **Strong DAX Language:** Powerful for complex calculations.	- **Visualization Prowess:** Arguably more advanced and flexible visuals. - **Handles Massive Datasets:** Excellent performance with very large, complex data. - **Maturity & Community:** Long-standing leader with a vast community. - **Strong Data Discovery:** Superior for ad-hoc, exploratory analysis.

Cons	- **Less Customizable Visuals:** Not as flexible as Tableau for bespoke visuals. - **Primarily Windows:** Desktop is Windows-only. - **Performance:** Can struggle with extremely large datasets compared to Tableau.	- **Cost:** Significantly more expensive. - **Steeper Learning Curve:** More complex to master. - **Less Integrated with Microsoft Stack:** Integration is good, but not as native as Power BI.

12. Explain how Power BI integrates with Azure services.

Power BI integrates deeply with various Azure services, creating a powerful cloud analytics platform:

- **Azure Data Services:** Connects directly to **Azure SQL Database, Azure Synapse Analytics, Azure Data Lake Storage, and Azure Blob Storage** as data sources.
- **Power BI Embedded:** Allows developers to embed interactive reports into their own custom applications using an Azure service.
- **Azure Active Directory (AAD):** Used for authentication and security, enabling row-level security (RLS) based on AAD users and groups.
- **Azure Data Factory:** Can orchestrate data pipelines that load data into a destination used by Power BI.

13. What are "gateways" in Power BI, and when are they needed?

A **gateway** is a bridge that enables secure data transfer between on-premises data sources (data that isn't in the cloud) and the Power BI Service in the cloud.

When are they needed?
You need an **On-premises Data Gateway** when your Power BI report in the cloud needs to refresh its data from a source that is inside your corporate network, such as:

- A SQL Server database on a local server.
- An Excel file on a shared network drive.
- An on-premises SharePoint site

14. How would you convince a company to adopt Power BI? (ROI argument)

"Adopting Power BI provides a strong Return on Investment (ROI) by transforming raw data into actionable insights that drive efficiency and revenue.

1. **Increased Productivity:** It reduces the time employees spend manually compiling reports in Excel by up to 70%, freeing them for higher-value analysis.
2. **Faster, Better Decisions:** Interactive dashboards allow managers to identify trends, opportunities, and problems in real-time, leading to more informed and timely strategic decisions.
3. **Cost Reduction:** It eliminates the need for expensive, legacy reporting systems and reduces IT dependency for report creation through its self-service nature.
4. **Revenue Growth:** By providing sales and marketing teams with clear visibility into performance and customer behavior, they can optimize strategies to close more deals and improve customer retention.

15. What security features does Power BI offer for sensitive data?

Power BI offers a multi-layered security model:

1. **Authentication:** Integrated with **Azure Active Directory (AAD)**, ensuring only authorized users can access the service.

2. **Row-Level Security (RLS):** Allows you to restrict data access for given users. For example, a salesperson can only see data for their own region.

3. **Data Encryption:** Data is encrypted both **in transit** (using HTTPS/TLS) and **at rest** in Microsoft's data centers.

4. **Sensitivity Labels:** Labels from Microsoft Purview Information Protection can be applied to reports and dashboards to classify and protect sensitive data, enforcing policies like encryption and access restrictions.

5. **Auditing and Compliance:** Extensive audit logs and compliance with industry standards like SOC, ISO, and GDPR.