**1) In your own words, what is a subquery?**

-A subquery is a query that is nested within a larger, broader query that would enable you to perform a second query of the database using the constraints of the initial outer query.

**2) In your own words, what is a self-contained subquery?**

-A self-contained subquery is a subquery that is independent and does not require any input from the outer query.

**3) In your own words, what is a correlated subquery?**

-A correlated subquery is a query that requires an input from its outer query. It is fully dependent on the outer query and can’t be executed without the required attributes from the outer query.

**4) Give an example of a subquery that returns a single value. When would you use this kind of subquery?**

SELECT \*

FROM Sales.SalesOrderHeader

WHERE CustomerID = (SELECT MAX(CustomerID)

FROM Sales.Customer)

You would use a scalar subquery any time that you would want to insert values from another table into a newly created table.

**5) Give an example of a subquery that returns multiple values. When would you use this kind of subquery?**

SELECT \*

FROM Sales.Customer

WHERE CustomerID IN (SELECT CustomerID

FROM Sales.SalesOrderHeader

WHERE SubTotal > 100000)

You would use a multivalued subquery when for when you would want to identify items that are low in stock while also identifying the orders those items were placed under.

**6) Give an example of a subquery that returns table values. When would you use this kind of subquery?**

SELECT ROW\_NUMBER() OVER (ORDER BY d.OrderYear, d.OrderMonth)

, d.OrderYear, d.OrderMonth

, d.OrderAmount

FROM

(SELECT YEAR(OrderDate) OrderYear

, MONTH(OrderDate) OrderMonth

, SUM(SubTotal) OrderAmount

FROM Sales.SalesOrderHeader

GROUP BY YEAR(OrderDate), MONTH(OrderDate)) d

You would use this type of subquery when you want to retrieve the entire table in your search result.

**7) What does the exists predicate do? Give an example.**

-The EXISTS predicate accepts a subquery as input and returns TRUE if the subquery returns any rows and FALSE otherwise.

**8) What happens if we use the not operator before a predicate? Give an example.**

-When you use the NOT operator before a predicate, you negate or find the inverse of the predicate. An example would be “AND NOT EXISTS”, which would return TRUE if the condition does not exist.

**9) When you use exists or not exists with respect to a row in a database, does it return two or three values? Explain your answer**.

-It will return two values because either the value exists, or it does not. There is no situation where it would be unknown whether a query returns any rows.

**10)How would you a subquery to calculate aggregates? For example, you want to calculate yearly sales of a product, and you also want to keep a running sum of total sales. Explain how you would use a subquery to do this.**

-You would subquery to calculate aggregates as follows:

SELECT orderyear, qty,

(SELECT SUM(02.qty)

FROM Sales.OrderTotalsByYear AS 02

WHERE 02.orderyear <= 01.orderyear) AS runqty

FROM Sales.OrderTotalsByYear as 01

ORDER BY orderyear

You can use the aggregates in a subquery to add the total quantities from the years together and display them in the output as a running quantity.