

Step 1: Find the average amount paid by the top 5 customers.

1a.

```
WITH average_cte (customer_id, first_name, last_name, country, city, total_amount_paid)
AS
(SELECT A.customer_id, A.first_name, A.last_name, D.country, C.city, SUM(E.amount)
AS total_amount_paid
FROM customer A
INNER JOIN address B ON A.address_id = B.address_id
INNER JOIN city C ON B.city_id = C.city_id
INNER JOIN country D ON C.country_id = D.country_id
INNER JOIN payment E ON A.customer_id = E.customer_id
WHERE city IN('Aurora',
              'Acua',
              'Citrus Height',
              'Iwaki',
              'Ambattur',
              'Shanwei',
              'So Leopoldo',
              'Teboksary',
              'Tianjin',
              'Cianjur'))
GROUP BY A.customer_id, A.first_name, A.last_name, D.country, C.city
ORDER BY total_amount_paid DESC
LIMIT 5)
SELECT
      AVG(total_amount_paid) AS average
FROM average_cte
```



```

INNER JOIN country D ON C.country_id = D.country_id
INNER JOIN payment E ON A.customer_id = E.customer_id
WHERE city IN('Aurora',
              'Acua',
              'Citrus Height',
              'Iwaki',
              'Ambattur',
              'Shanwei',
              'So Leopoldo',
              'Teboksary',
              'Tianjin',
              'Cianjur')
GROUP BY A.customer_id, A.first_name, A.last_name, D.country, C.city
ORDER BY total_amount_paid DESC
LIMIT 5)
SELECT D.country,
       COUNT(DISTINCT A.customer_id) AS all_customer_count,
       COUNT(DISTINCT top_5_customers) AS top_5_customers_count
FROM customer A
INNER JOIN address B ON A.address_id = B.address_id
INNER JOIN city C ON B.city_id = C.city_id
INNER JOIN country D ON C.country_id = D.country_id
LEFT JOIN top_5_customers
ON A.customer_id = top_5_customers.customer_id
GROUP BY D.country
ORDER BY COUNT(A.customer_id) DESC
LIMIT 5;

```

Query
Query History

```

1 WITH top_5_customers(customer_id, first_name, last_name, country, city,
2                        total_amount_paid)
3 AS
4 (SELECT A.customer_id,A.first_name, A.last_name, D.country, C.city, SUM(E.amount)
5 AS total_amount_paid
6 FROM customer A
7 INNER JOIN address B ON A.address_id = B.address_id
8 INNER JOIN city C ON B.city_id = C.city_id
9 INNER JOIN country D ON C.country_id = D.country_id
10 INNER JOIN payment E ON A.customer_id = E.customer_id
11 WHERE city IN('Aurora',
12              'Acua',
13              'Citrus Height',
14              'Iwaki',
15              'Ambattur',
16              'Shanwei',
17              'So Leopoldo',
18              'Teboksary',
19              'Tianjin',
20              'Cianjur'))
21 GROUP BY A.customer_id, A.first_name, A.last_name, D.country, C.city
22 ORDER BY total_amount_paid DESC
23 LIMIT 5)
24 SELECT D.country,
25        COUNT(DISTINCT A.customer_id) AS all_customer_count,
26        COUNT(DISTINCT top_5_customers) AS top_5_customers_count
27 FROM customer A
28 INNER JOIN address B ON A.address_id = B.address_id

```

Data Output
Messages
Notifications

	country character varying (50)	all_customer_count bigint	top_5_customers_count bigint
1	India	60	1
2	China	53	1
3	United States	36	1
4	Japan	31	1
5	Mexico	30	1

This was similar to the last one. I had to write the CTE as the outer query. Then I had to create a join like was done with the subquery. Last I had to use a left join to find the top 5 customers and group them by country then order by counting customer ids.

2. #1a- The aggregate cost of the CTE was 64.49,

The cost for the statement with the subquery was 64.49 and the limit coast was 64.41 which was the same for the sort cost. There does not appear to be much difference between the two costs for this query.

#1b The cost of the CTE was 168.16. The cost for the subquery was 167.76. The subquery cost slightly less. There were other costs, but I am not sure what they were referencing. I thought the CTE would be less cost, so I was surprised it was slightly higher.

3. The 1st one was not very difficult at all. I simply had to replace the outer query with the CTE. I did the same for the last one, but it took me some time to get the joins correct. I was surprised that I had to use the FROM for the customer table as this did not match the CTE name as was posted in the directions, but once it was in, it made sense. The syntax is a bit tricky, but I think using it more will make it easier.