

Question 1:

Row Labels	Order Quantity
Canada	
Tires and Tubes	
Mountain Tire Tube	649
Grand Total	649

Question 2:

A	B
Row Labels	Order Quantity
Canada	
Tires and Tubes	
Mountain Tire Tube	
NA	
British Columbia	644
Grand Total	644

Question 3:

Row Labels	Order Quantity
Tires and Tubes	
Mountain Tire Tube	
NA	
North America	1978
Grand Total	1978

Question 4:

Sales Amount	Column Labels						
Row Labels	Australia	Canada	France	Germany	United Kingdom	United States	Grand Total
⊕ Road Bikes							
1							
2013	329513.5525	26702.1	118934.6425	110760.8875	176378.3125	210722.33	973011.825
2							
2013	477733.82	63611.15	99478.53	119282.94	150925.97	327084.23	1238116.64
3							
2013	535121.87	51825.75	132242.23	123076.95	155205.74	338952.49	1336425.03
4							
2013	543643.75	76017.56	155138.8	181085.47	184878.47	450813.2	1591577.25
Grand Total	1886012.992	218156.56	505794.2025	534206.2475	667388.4925	1327572.25	5139130.745

Question 5:

Sparse means that in certain tables, we will have unfilled or zero for an table, mountain bike tires are not sold during the winter months, and are unfilled and thus, we have a sparse cube.

Question 6:

Our Sales Database is de-normalized as it does not rely on other tables for its information.

If this de-normalized table were placed in an OLTP database, it could lead to inconsistencies, such as:

- **Data Duplication:** Customer names and addresses would be repeated for every transaction, increasing the risk of inconsistencies if updates are not made uniformly.
- **Update Anomalies:** If a customer's address changes, it would need to be updated in multiple rows, leading to potential discrepancies if any rows are missed.
- **Insert Anomalies:** Adding new products or customers could require inserting redundant data, increasing storage requirements and maintenance complexity.

Question 7

1. Sales Table:

- **Fields:** Transaction ID, Date, Customer ID, Product ID, Quantity, Price

2. Customers Table:

- **Fields:** Customer ID, Customer Name, Customer Address

3. Products Table:

- **Fields:** Product ID, Product Name, Category

4. Dates Table:

- **Fields:** Date, Month, Year, Quarter