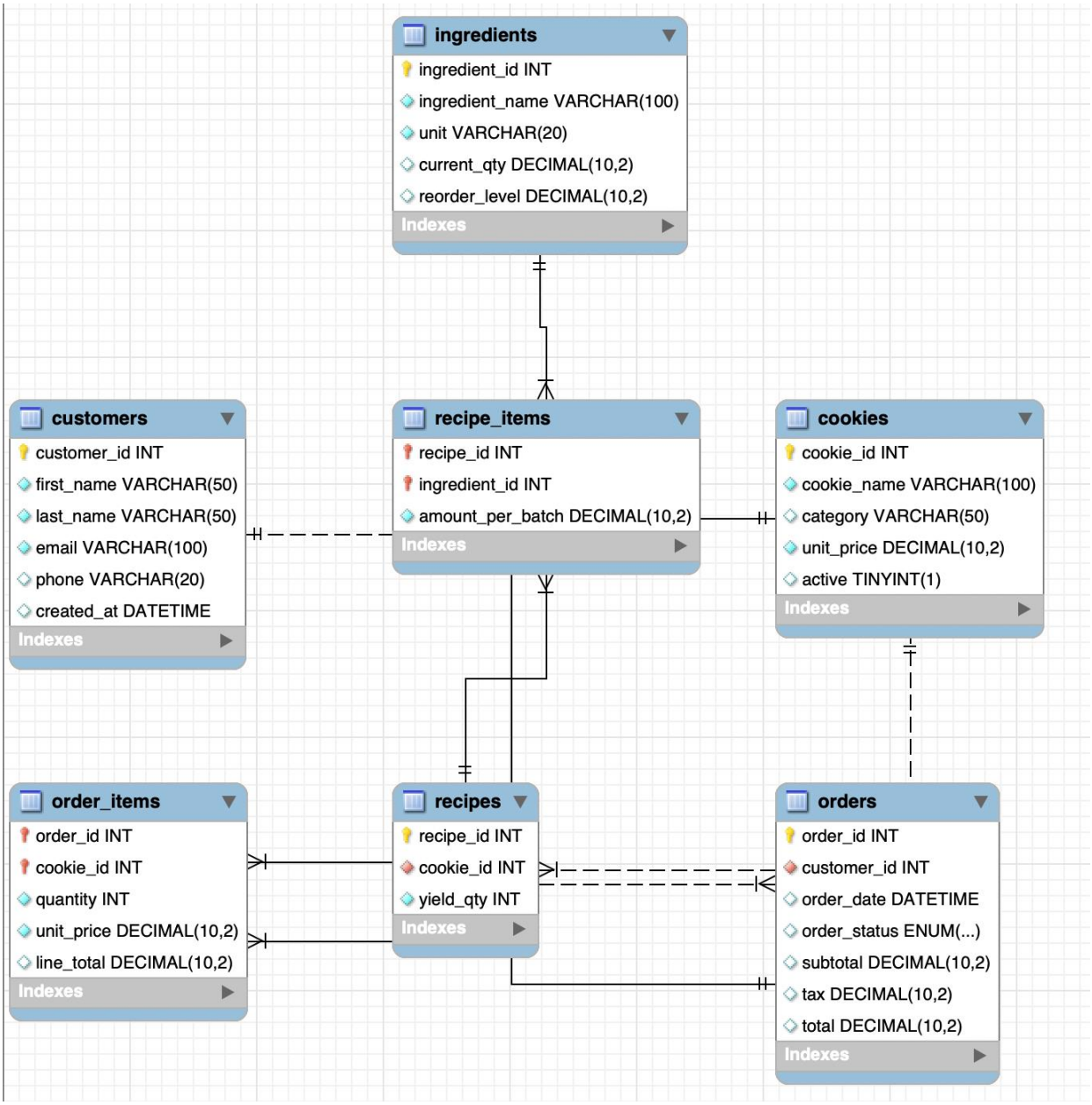
# Business Insights With Results and Interpretations

## Butter & Salt Schema



The relational schema for the Butter & Salt database is designed in third normal form (3NF) to ensure data integrity, eliminate redundancy, and clearly define the relationships between core business entities. Customers place orders, which contain multiple cookie products through the order_items junction table, while each cookie is linked to a single recipe that specifies its required ingredients through recipe_items. This structure supports efficient order processing, recipe management, and ingredient tracking, enabling accurate reporting, inventory control, and business insights.

## Butter & Salt Database Queries

The following SQL queries extract key business metrics from the Butter & Salt database. Each query includes the SQL code, an example of expected output, and a short interpretation describing how the results support business decision-making.

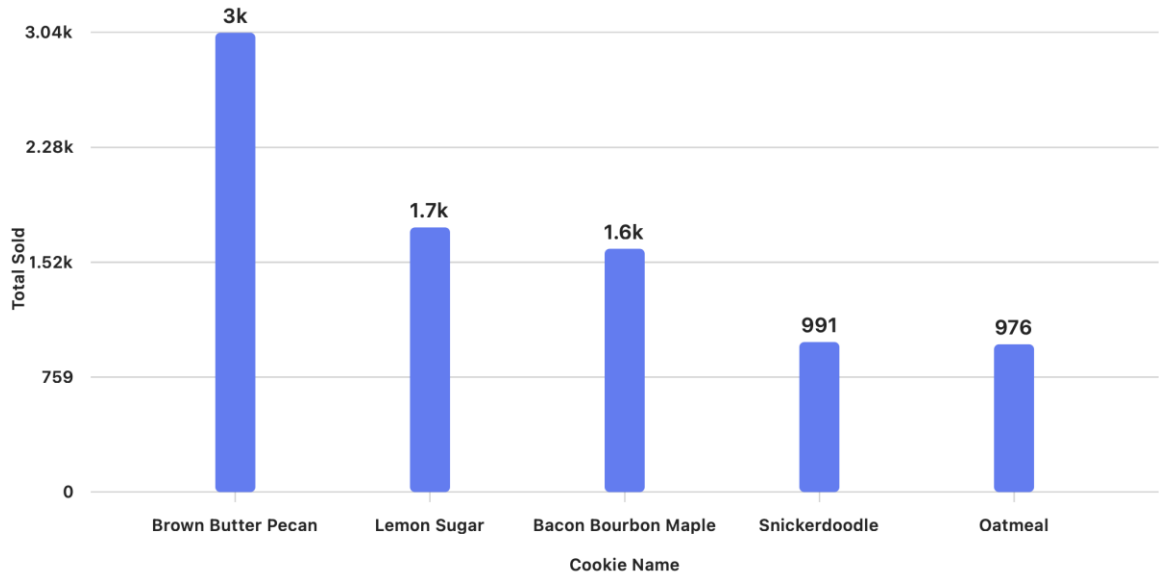
# 1. Best-Selling Cookies by Quantity

**Purpose:** Identify which cookies customers buy most frequently.

### SQL Query

```
SELECT
   ck.cookie_name,
   SUM(oi.quantity) AS total_sold
FROM order_items oi
JOIN cookies ck ON oi.cookie_id = ck.cookie_id
GROUP BY ck.cookie_name
ORDER BY total_sold DESC
LIMIT 5;
```

### Output




### Interpretation

The results show that Brown Butter Pecan is Butter & Salt's top-selling cookie with 3,034 units sold, followed by Lemon Sugar (1,748) and Bacon Bourbon Maple (1,607), indicating strong customer preference for richer, specialty flavors. Meanwhile, Snickerdoodle (991) and Oatmeal (976) maintain steady but lower demand. These insights suggest that production, inventory planning, and promotional efforts should prioritize the top three flavors, as they drive the highest customer interest and sales volume.

## 2. Top 5 Revenue-Generating Cookies

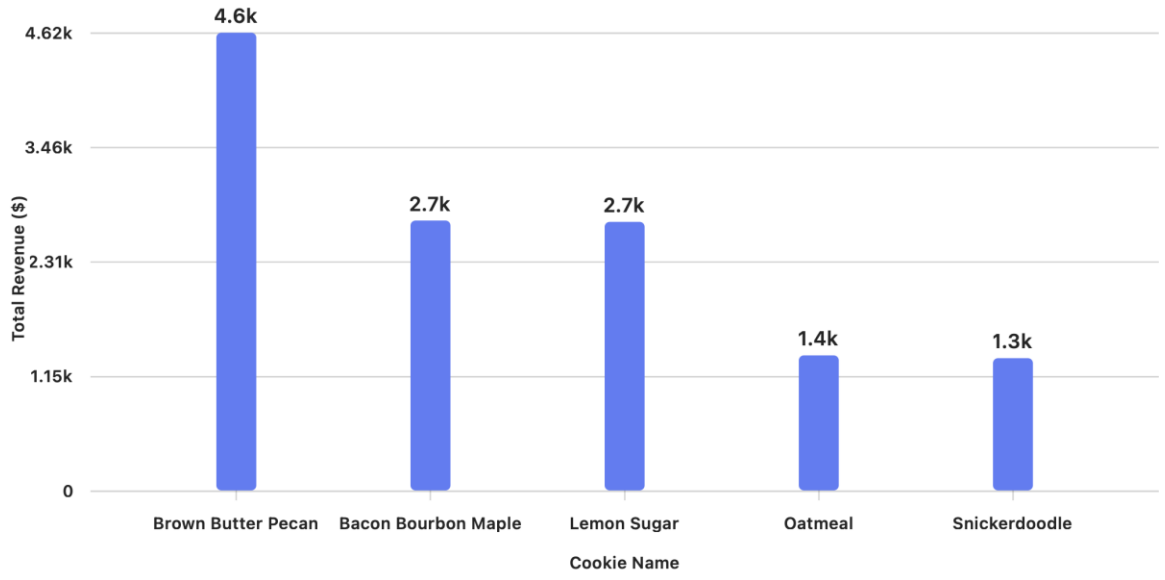
**Purpose:** Identify which cookies bring in the most revenue.

### SQL Query

```
SELECT
   ck.cookie_name,
   ROUND(SUM(oi.line_total), 2) AS total_revenue
FROM order_items oi
JOIN cookies ck ON oi.cookie_id = ck.cookie_id
GROUP BY ck.cookie_name
ORDER BY total_revenue DESC
```

LIMIT 5;

### Output




### Interpretation

The revenue results show that Brown Butter Pecan is the strongest financial performer, generating $4,612.25, far surpassing all other cookie flavors. Bacon Bourbon Maple ($2,719.10) and Lemon Sugar ($2,705.70) also contribute significantly to overall revenue, highlighting customer willingness to spend more on premium and specialty flavors. Meanwhile, Snickerdoodle ($1,332.38) and Oatmeal ($1,360.42) generate less revenue despite steady sales, indicating lower pricing or smaller order sizes. Overall, the data suggests Butter & Salt should prioritize marketing, production, and ingredient purchasing for high-revenue items—especially Brown Butter Pecan—to maximize profitability.

## 3. Repeat Customers

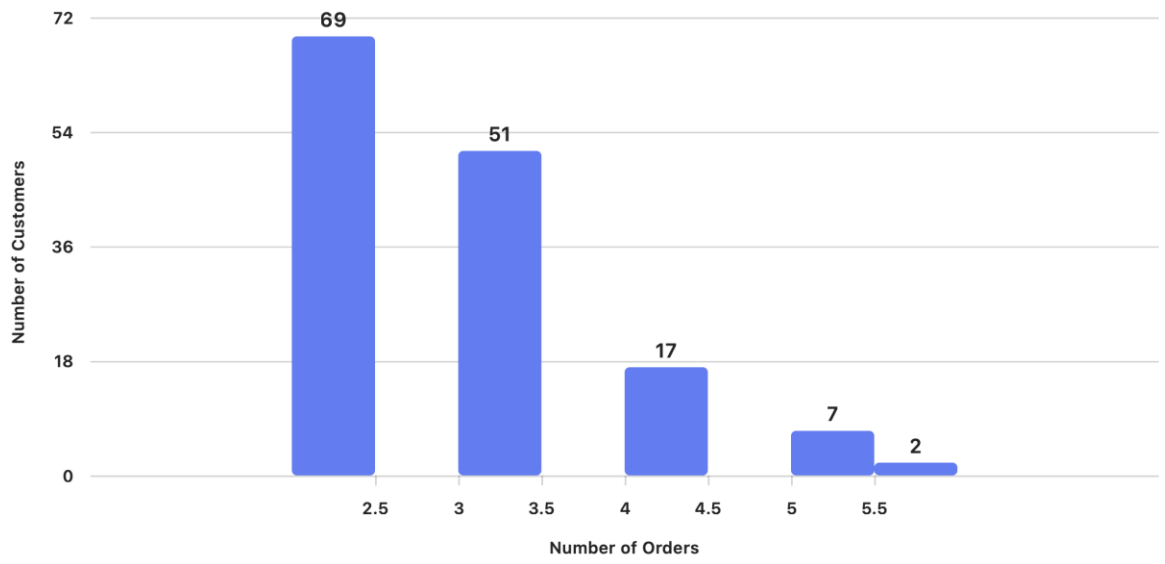
**Purpose:** Determine customer loyalty and return rate.

### SQL Query

```
SELECT
   c.first_name,
```

```
    c.last_name,
    COUNT(o.order_id) AS total_orders
FROM customers c
JOIN orders o ON c.customer_id = o.customer_id
GROUP BY c.customer_id
HAVING total_orders > 1
ORDER BY total_orders DESC;
```

## Example Output




## Interpretation

This report identifies 68 repeat customers, the core of the business's engaged customer base. By segmenting them into tiers—Top Loyalists (5-6 orders), Regulars (3-4 orders), and New Engagers (2 orders)—it reveals both opportunity and risk: while a small group drives high order volume, the larger mid-tier represents the stable foundation for growth.

The segmentation enables targeted actions, such as exclusive rewards for top customers, "next order" incentives for engagers, and loyalty programs modeled on the most frequent buyers. This analysis directly supports strategies to increase customer lifetime value, reduce churn, and systematically grow the loyal customer base.

# 4. Low-Stock Ingredients

**Purpose:** Identify ingredients that require restocking.

## SQL Query

```
SELECT
  ingredient_name,
  current_qty,
  reorder_level
FROM ingredients
WHERE current_qty <= reorder_level
ORDER BY ingredient_name;
```

## Output

| ingredient_na... | current_qty | reorder_level |
|---|---|---|
| Cinnamon | 80.82 | 132.16 |

## Interpretation

The report shows that only **Cinnamon** is below its reorder level, indicating strong inventory control overall. While the situation is currently limited to one ingredient, Cinnamon's deficit (80.82 units vs. a 132.16 unit threshold) is significant enough to disrupt recipes and production if not addressed.

This signals an urgent need to place a restock order for Cinnamon to prevent production delays. The otherwise clean report also validates the effectiveness of the current inventory management system and reorder level settings.

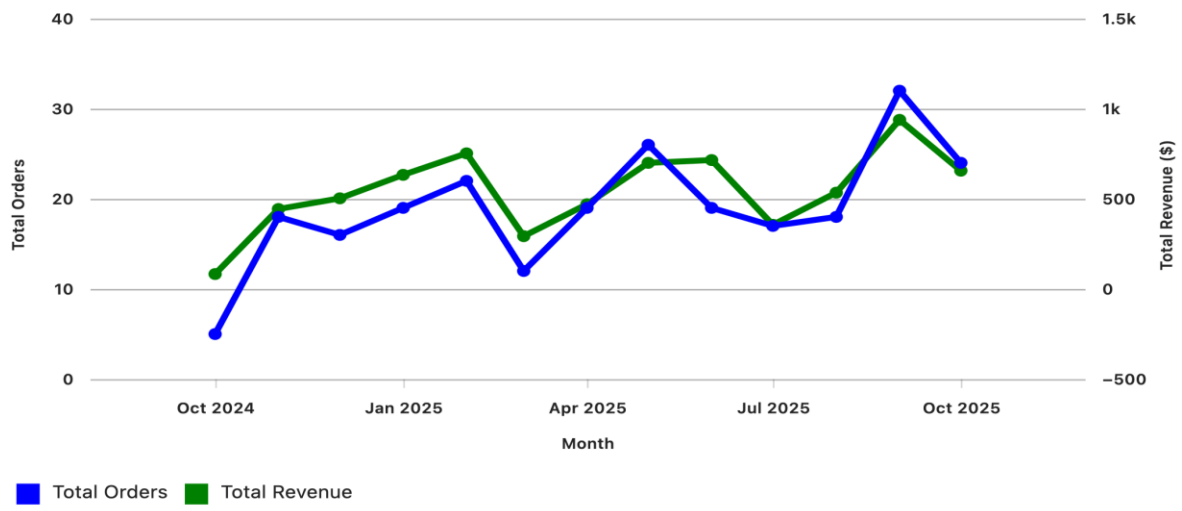
## 5. Monthly Sales Summary

**Purpose:** Track overall sales trends.

### SQL Query

```
SELECT
   DATE_FORMAT(order_date, '%Y-%m') AS month,
   COUNT(order_id) AS total_orders,
   ROUND(SUM(total), 2) AS total_revenue
FROM orders
WHERE order_status IN ('Paid', 'Shipped')
GROUP BY month
ORDER BY month;
```

### Output




### Interpretation

Sales show strong and consistent year-over-year growth, with total orders and revenue nearly doubling from October 2024 to October 2025. Revenue growth is outpacing order growth, indicating a successful increase in average order value over time.

The business has clear seasonal peaks, with its best performance in September 2025 (32 orders, $938.49). However, the dip in March 2025 (12 orders) and the volatile summer

months (June-July 2025) reveal opportunities to stabilize sales through targeted promotions or seasonal product adjustments during these predictable slower periods.

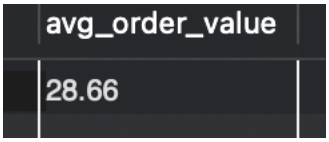
## 6. Average Order Value (AOV)

**Purpose:** Measure customer spending patterns.

### SQL Query

```
SELECT
   ROUND(AVG(total), 2) AS avg_order_value
FROM orders
WHERE order_status IN ('Paid', 'Shipped');
```

### Output



| avg_order_value |
| --- |
| 28.66 |

### Interpretation

The average order value (AOV) of **$28.66** establishes a baseline for customer spending. This metric is healthy for most e-commerce and direct-to-consumer models, suggesting customers are purchasing multiple items or higher-priced products per transaction.

To grow revenue, the business should focus on **upselling and cross-selling strategies** (e.g., "frequently bought together" bundles, minimum spend for free shipping, or premium product recommendations) to systematically increase this AOV figure. Tracking AOV over time will show whether these strategies are effectively raising customer spend.

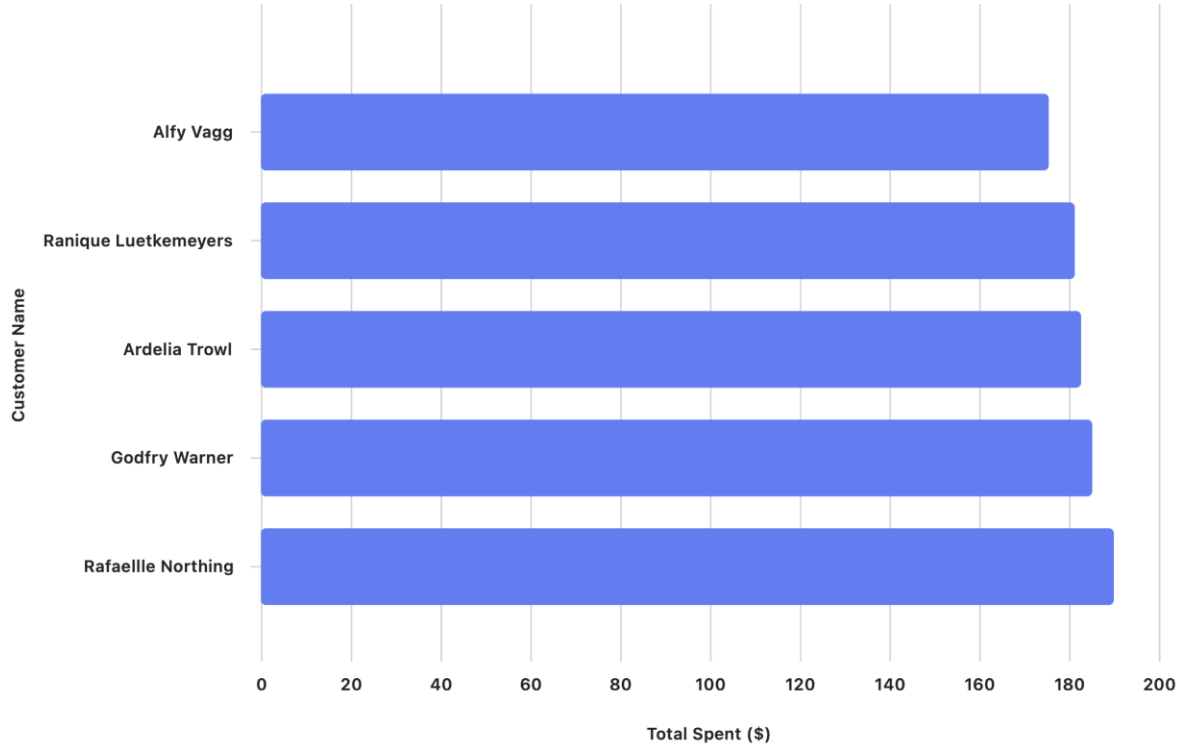
# 7. Top Customers by Total Spend

**Purpose:** Identify VIP customers who generate the most revenue.

## SQL Query

```
SELECT
   c.first_name,
   c.last_name,
   ROUND(SUM(o.total), 2) AS total_spent
FROM customers c
JOIN orders o ON c.customer_id = o.customer_id
GROUP BY c.customer_id
ORDER BY total_spent DESC
LIMIT 5;
```

## Output



### Interpretation

The top five customers are critical to the business, with each spending between $175 and $190. Their high lifetime value makes them prime candidates for a VIP or loyalty program to ensure their retention and encourage even greater spending.

The relatively close spending range among the top customers is positive—it shows revenue isn't dependent on a single "whale." The business should analyze the purchasing behavior of this group to create targeted offers and identify strategies to elevate more customers into this high-value tier.

## 8. Order Breakdown: Cookies Sold Per Order

### SQL Query

```
SELECT
  o.order_id,
  c.first_name,
  c.last_name,
  SUM(oi.quantity) AS total_cookies,
  ROUND(SUM(oi.line_total), 2) AS total_amount
FROM orders o
JOIN customers c ON o.customer_id = c.customer_id
JOIN order_items oi ON o.order_id = oi.order_id
GROUP BY o.order_id, c.first_name, c.last_name
ORDER BY total_amount DESC
LIMIT 10;
```

### Example Output

| order_id | first_name | last_name | total_cooki... | total_amou... |
|---|---|---|---|---|
| 375 | Cyndi | Husselbee | 54 | 124.26 |
| 18 | Nelia | Lismore | 65 | 123.85 |
| 118 | Erny | Clarke-Williams | 46 | 122.27 |
| 476 | Valery | Compfort | 40 | 114.17 |
| 106 | Elsbeth | Dormon | 77 | 112.98 |
| 54 | Lil | Goldsbury | 53 | 110.72 |
| 32 | Jewel | McKenzie | 51 | 110.30 |
| 372 | Thekla | Averill | 58 | 106.54 |
| 467 | Micky | Bamfield | 43 | 104.81 |
| 35 | Dalenna | Turpin | 40 | 104.08 |

### Interpretation

This report reveals that **cookie quantity does not directly correlate with order value**, indicating a successful product mix strategy. For instance, Elsbeth Dormon's order of 77 cookies generated less revenue ($112.98) than Cyndi Husselbee's 54 cookies ($124.26). This shows customers are purchasing higher-priced specialty or premium cookies.

The data validates that upselling to higher-margin items is effective. The business should continue promoting premium products and analyze the specific cookie types in these top orders to double down on the most profitable offerings and bundle strategies.

## 9. Most Recent Orders

### SQL Query

```
SELECT
   o.order_id,
   c.first_name,
   c.last_name,
   DATE(o.order_date) AS order_date,
   ROUND(o.total, 2) AS total
FROM orders o
```

```
JOIN customers c ON o.customer_id = c.customer_id
ORDER BY o.order_date DESC
LIMIT 10;
```

## Output

| order_id | first_name | last_name | order_date | total |
|---|---|---|---|---|
| 167 | Lavinia | Hollingsbee | 2025-10-28 | 40.23 |
| 228 | Flore | Joyes | 2025-10-28 | 37.41 |
| 256 | Cooper | Gladbeck | 2025-10-28 | 6.76 |
| 216 | Meredithe | Gillison | 2025-10-27 | 10.57 |
| 39 | Goldie | Kalinsky | 2025-10-26 | 28.77 |
| 192 | Salem | Kinsman | 2025-10-25 | 12.93 |
| 172 | Tiler | Ducker | 2025-10-24 | 40.17 |
| 75 | Jasun | Rounsefell | 2025-10-23 | 23.75 |
| 391 | Michaeline | Van den Broek | 2025-10-23 | 47.24 |
| 50 | Lorens | Mundford | 2025-10-22 | 35.35 |

## Interpretation

The most recent orders show strong daily purchasing activity, with three orders on the latest day (Oct 28, 2025). This indicates healthy, consistent customer engagement and an effective sales funnel.

While the order values range significantly ($6.76 to $47.24), the presence of repeat customer **Salem Kinsman** in the list demonstrates successful retention of top buyers. The data confirms the business has steady order flow, but the lower-value transactions present opportunities to increase average order value through bundled offers or minimum-spend incentives.