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```
PROJECT: COSMETICS PRODUCT INTELLIGENCE (SQL)

DATA SOURCE: cosmetics_clean (SQLite)
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```
SECTION 0: DATA VALIDATION
```
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```

Q0.1 — How many products are loaded?
```
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```
```sql
SELECT COUNT(*) AS total_products
FROM cosmetics_clean;
```

total_products
1473

Q0.2 — Are there missing values in key columns?
```
------------------------------------------------
```
```sql
SELECT
    SUM(CASE WHEN price IS NULL THEN 1 ELSE 0 END) AS missing_price,
    SUM(CASE WHEN rating IS NULL THEN 1 ELSE 0 END) AS missing_rating,
    SUM(CASE WHEN brand IS NULL OR brand = '' THEN 1 ELSE 0 END) AS missing_brand
FROM cosmetics_clean;
```

missing_price	missing_rating	missing_brand
0	0	0

Q0.3 — Are skin-type columns numeric (0/1)?
```
--------------------------------------------
```
```sql
SELECT DISTINCT normal, dry, oily, sensitive
FROM cosmetics_clean
LIMIT 20;
```

	normal	dry	oily	sensitive
1	0	0	0	0
2	1	1	1	1
3	1	1	1	0
4	1	0	1	1
5	1	0	1	0
6	1	1	0	1
7	1	1	0	0

SECTION 1: FEATURE ENGINEERING

Q1.1 — How many skin types does each product support?

UPDATE cosmetics_clean
SET skin_type_coverage =
    normal + dry + oily + sensitive;

```
Execution finished without errors.
Result: query executed successfully. Took 1ms, 1473 rows affected
At line 28:
UPDATE cosmetics_clean
SET skin_type_coverage =
    normal + dry + oily + sensitive;
```

Q1.2 — Distribution of skin-type coverage

```
SELECT
    skin_type_coverage,
    COUNT(*) AS product_count
FROM cosmetics_clean
GROUP BY skin_type_coverage
ORDER BY skin_type_coverage DESC;
```

	skin_type_coverage	product_count	
1	4	662	
2	3	226	
3	2	75	
4	1	38	
5	0	472	

SECTION 2: CORE KPIs (EXECUTIVE LEVEL)

Q2.1 — What is the average product price?

```
SELECT ROUND(AVG(price), 2) AS average_price
FROM cosmetics_clean;
```

average_price
1 55.55

Q2.2 — What is the average customer rating?

SELECT ROUND(AVG(rating), 2) AS average_rating
FROM cosmetics_clean;

average_rating
1 4.15

Q2.3 — Total number of brands

SELECT COUNT(DISTINCT brand) AS total_brands
FROM cosmetics_clean;

total_brands
1 117

SECTION 3: BRAND & CATEGORY OVERVIEW

Q3.1 — Which brands have the most products?

```
-----------------------------------------
SELECT
    brand,
    COUNT(*) AS product_count
FROM cosmetics_clean
GROUP BY brand
ORDER BY product_count DESC;
```

	brand	product_count
1	CLINIQUE	79
2	SEPHORA COLLECTION	66
3	SHISEIDO	63
4	ORIGINS	54
5	MURAD	47
6	PETER THOMAS ROTH	46
7	KIEHL'S SINCE 1851	46

Q3.2 — Which categories dominate the market?

```
---------------------------------------------
SELECT
    category,
    COUNT(*) AS product_count
FROM cosmetics_clean
GROUP BY category
ORDER BY product_count DESC;
```

	category	product_count
1	Moisturizer	298
2	Cleanser	281
3	Face Mask	266
4	Treatment	248
5	Eye cream	209
6	Sun protect	170
7	Label	1

SECTION 4: PRICE ANALYSIS

Q4.1 — Price segment distribution

```
SELECT
    price_segment,
    COUNT(*) AS product_count
FROM cosmetics_clean
GROUP BY price_segment;
```

	price_segment	product_count
1	Budget	231
2	Luxury	434
3	Mid-Range	808

SECTION 5: PRICE vs RATING (CLASSIC BUSINESS QUESTION)

Q5.1 — Does higher price mean better rating?

```
SELECT
   price_segment,
   ROUND(AVG(rating), 2) AS avg_rating,
   COUNT(*) AS product_count
FROM cosmetics_clean
GROUP BY price_segment
ORDER BY avg_rating DESC;
```

	price_segment	avg_rating	product_count
1	Mid-Range	4.17	808
2	Luxury	4.13	434
3	Budget	4.12	231

SECTION 6: ADVANCED — PRICE × SKIN TYPE × RATING

Q6.1 — How does skin coverage change the price–rating relationship?

SELECT

```
    price_segment,
    skin_type_coverage,
    ROUND(AVG(rating), 2) AS avg_rating,
    COUNT(*) AS product_count
FROM cosmetics_clean
GROUP BY price_segment, skin_type_coverage
ORDER BY price_segment, skin_type_coverage DESC;
```

price_segment	skin_type_coverage	avg_rating	product_count
Budget	4	4.15	108
Budget	3	4.29	25
Budget	2	4.18	5
Budget	1	4.15	6
Budget	0	4.03	87
Luxury	4	4.08	197
Luxury	3	4.19	77

SECTION 7: VALUE & STRATEGY ANALYSIS (VERY ADVANCED)

Q7.1 — Best value-for-money products

```
SELECT
    brand,
    product_name,
    price,
    rating,
    ROUND(rating / price, 4) AS price_efficiency
FROM cosmetics_clean
WHERE price > 0
ORDER BY price_efficiency DESC
LIMIT 15;
```

	brand	product_name	price	rating	price_efficiency
1	SEPHORA COLLECTION	Sleeping Mask - Coconut Water	4.0	5.0	1.25
2	SEPHORA COLLECTION	Sleeping Mask - Aloe Vera	4.0	5.0	1.25
3	SEPHORA COLLECTION	Soft Touch Cotton Pads	4.0	4.6	1.15
4	SEPHORA COLLECTION	Sleeping Mask - Rose	4.0	4.3	1.075
5	SEPHORA COLLECTION	Lip Mask	3.0	3.2	1.0667
6	SEPHORA COLLECTION	Sleeping Mask	4.0	4.2	1.05
7	SEPHORA COLLECTION	Sleeping Mask - Pearl	4.0	4.0	1.0

Q7.2 — Inclusivity premium analysis

SELECT
    skin_type_coverage,
    ROUND(AVG(price), 2) AS avg_price,
    ROUND(AVG(rating), 2) AS avg_rating,
    COUNT(*) AS product_count
FROM cosmetics_clean
GROUP BY skin_type_coverage
ORDER BY skin_type_coverage DESC;

	skin_type_coverage	avg_price	avg_rating	product_count
1	4	56.64	4.15	662
2	3	56.75	4.2	226
3	2	60.71	4.3	75
4	1	47.32	4.17	38
5	0	53.28	4.1	472

SECTION 8: PRODUCT & BRAND RISK ANALYSIS (UNIQUE)

Q8.1 — Brand consistency (rating stability)

SELECT
    brand,
    ROUND(AVG(rating), 2) AS avg_rating,

```
    ROUND(MAX(rating) - MIN(rating), 2) AS rating_spread,
    COUNT(*) AS product_count
FROM cosmetics_clean
GROUP BY brand
HAVING product_count >= 10
ORDER BY rating_spread ASC;
```

brand	avg_rating	rating_spread	product_count
FARMACY	4.42	0.5	13
HERBIVORE	4.35	0.6	11
BOBBI BROWN	4.31	0.7	10
OLEHENRIKSEN	4.34	0.8	27
KORRES	4.35	0.9	14
TARTE	4.16	0.9	18

Q8.2 — One-hit-wonder brands

```
SELECT
    brand,
    COUNT(*) AS total_products,
    MAX(rating) AS best_rating,
    ROUND(AVG(rating), 2) AS avg_rating
FROM cosmetics_clean
GROUP BY brand
HAVING total_products >= 10
ORDER BY best_rating DESC;
```

	brand	total_products	best_rating	avg_rating
1	SUPERGOOP!	15	5.0	4.18
2	SHISEIDO	63	5.0	4.2
3	SEPHORA COLLECTION	66	5.0	4.22
4	PERRICONE MD	30	5.0	4.26
5	MURAD	47	5.0	4.16
6	LANEIGE	18	5.0	4.43
7	LANCÔME	34	5.0	4.24

SECTION 9: CONSUMER RECOMMENDATION LOGIC

Q9.1 — Safe-buy products (high rating + fair price + inclusive)

```
SELECT
    brand,
    product_name,
    price,
    rating,
    skin_type_coverage
FROM cosmetics_clean
WHERE rating >= 4.3
  AND price BETWEEN 20 AND 40
  AND skin_type_coverage >= 3
ORDER BY rating DESC;
```

brand	product_name	price	rating	skin_type_coverage	
SEPHORA COLLECTION	Face Mask Magic	25.0	5.0	4	
DR ROEBUCK'S	Uluru Purifying Mask	28.0	5.0	4	
LANCÔME	Energie de Vie Glow Boosting Mini Mask Trio	39.0	5.0	4	
BEAUTYBIO	Bright Eyes Collagen-Infused Brightening Colloidal Silver ...	40.0	5.0	4	
SHISEIDO	Ultimate Sun Protection Lotion WetForce SPF 50+ Mini	22.0	5.0	4	
SUPERGOOP!	Invincible Setting Powder SPF 45 Refill	20.0	5.0	4	
COOLA	Sport Continuous Spray SPF 30 - Unscented	32.0	5.0	4	

1. Which products rank highest within each brand based on rating?

```
SELECT
    brand,
    product_name,
    rating,
    RANK() OVER (
        PARTITION BY brand
        ORDER BY rating DESC
    ) AS brand_rating_rank
FROM cosmetics_clean;
```

----

brand	product_name	rating	brand_rating_rank
ALGENIST	ELEVATE Advanced Retinol Serum	4.8	1
ALGENIST	Multi-Perfecting Detoxifying Exfoliator	4.6	2
ALGENIST	GENIUS Ultimate Anti-Aging Bi-Phase Peel	4.6	2
ALGENIST	PERFECT Clarifying Pore Corrector Mask	4.5	4
ALGENIST	Overnight Restorative Cream	4.4	5
ALGENIST	SUBLIME DEFENSE Ultra Lightweight UV Defense Fluid S...	4.4	5
ALGENIST	POWER Recharging Night Pressed Serum	4.4	5

2. What are the top 3 highest-rated products for each brand?

```
-------------------------------------------------------------
WITH ranked_products AS (
    SELECT
        brand,
        product_name,
        rating,
        ROW_NUMBER() OVER (
            PARTITION BY brand
            ORDER BY rating DESC
        ) AS rn
    FROM cosmetics_clean
)
SELECT *
FROM ranked_products
WHERE rn <= 3;
```

```
---------------------------------------------------
```

brand	product_name	rating	rn
ALGENIST	ELEVATE Advanced Retinol Serum	4.8	1
ALGENIST	Multi-Perfecting Detoxifying Exfoliator	4.6	2
ALGENIST	GENIUS Ultimate Anti-Aging Bi-Phase Peel	4.6	3
AMOREPACIFIC	TIME RESPONSE Vintage Wash-off Masque	5.0	1
AMOREPACIFIC	TIME RESPONSE Eye Reserve Crème	5.0	2
AMOREPACIFIC	Treatment Enzyme Peel	4.7	3
ANTHONY	Deep Pore Cleansing Clay	4.4	1

3. What percentage of the total catalog does each brand contribute?

```
-------------------------------------------------------------------
SELECT
    brand,
```

```
    COUNT(*) AS product_count,
    ROUND(
        COUNT(*) * 100.0 / SUM(COUNT(*)) OVER (),
        2
    ) AS market_share_percent
FROM cosmetics_clean
GROUP BY brand
ORDER BY market_share_percent DESC;
```

----

	brand	product_count	market_share_percent	
1	CLINIQUE	79	5.36	
2	SEPHORA COLLECTION	66	4.48	
3	SHISEIDO	63	4.28	
4	ORIGINS	54	3.67	
5	MURAD	47	3.19	
6	KIEHL'S SINCE 1851	46	3.12	
7	PETER THOMAS ROTH	46	3.12	

4. How does each product's rating compare to its brand's average?

```
SELECT
    brand,
    product_name,
    rating,
    ROUND(
        AVG(rating) OVER (PARTITION BY brand),
        2
    ) AS brand_avg_rating,
    ROUND(
        rating - AVG(rating) OVER (PARTITION BY brand),
        2
    ) AS diff_from_brand_avg
FROM cosmetics_clean;
```

----

	brand	product_name	rating	brand_avg_rating	diff_from_brand_avg	
1	ALGENIST	GENIUS Ultimate Anti-Aging Cream	4.3	3.99	0.31	
2	ALGENIST	Overnight Restorative Cream	4.4	3.99	0.41	
3	ALGENIST	SUBLIME DEFENSE Ultra Lightweight UV Defense Fluid S...	4.4	3.99	0.41	
4	ALGENIST	POWER Recharging Night Pressed Serum	4.4	3.99	0.41	
5	ALGENIST	Firming & Lifting Neck Cream	3.9	3.99	-0.09	
6	ALGENIST	Multi-Perfecting Detoxifying Exfoliator	4.6	3.99	0.61	
7	ALGENIST	GENIUS Ultimate Anti-Aging Melting Cleanser	4.1	3.99	0.11	

Execution finished without errors.

5. Which products outperform or underperform their brand average?

```
WITH brand_comparison AS (
    SELECT
        brand,
        product_name,
        rating,
        AVG(rating) OVER (PARTITION BY brand) AS brand_avg
    FROM cosmetics_clean
)
SELECT
    brand,
    product_name,
    rating,
    ROUND(rating - brand_avg, 2) AS performance_gap
FROM brand_comparison
ORDER BY performance_gap DESC;
```

	brand	product_name	rating	performance_gap
1	FOREO	Make My Day Hydrating & Anti-Pollution UFO™ Activated ...	5.0	1.76
2	FOREO	H2Overdose Mask	5.0	1.76
3	FOREO	Call It A Night Revitalizing & Nourishing UFO™ Activated ...	4.7	1.46
4	ST. TROPEZ TANNING ESSENTIALS	Self Tan Express Bronzing Face Sheet Mask	3.8	1.4
5	BEAUTYBIO	The Nightly Retinol + Peptide Anti-Aging Serum	5.0	1.34
6	BEAUTYBIO	Bright Eyes Collagen-Infused Brightening Colloidal Silver ...	5.0	1.34
7	MOROCCANOIL	Sun Oil 15 SPF	4.9	1.32

----

6. How does each product's price compare to the brand's average price?

```
SELECT
    brand,
    product_name,
    price,
```

```
    ROUND(
        AVG(price) OVER (PARTITION BY brand),
        2
    ) AS brand_avg_price,
    ROUND(
        price - AVG(price) OVER (PARTITION BY brand),
        2
    ) AS diff_from_brand_price
FROM cosmetics_clean;
```

	brand	product_name	price	brand_avg_price	diff_from_brand_price
1	ALGENIST	GENIUS Ultimate Anti-Aging Cream	112.0	70.78	41.22
2	ALGENIST	Overnight Restorative Cream	94.0	70.78	23.22
3	ALGENIST	SUBLIME DEFENSE Ultra Lightweight UV Defense Fluid S…	28.0	70.78	-42.78
4	ALGENIST	POWER Recharging Night Pressed Serum	95.0	70.78	24.22
5	ALGENIST	Firming & Lifting Neck Cream	98.0	70.78	27.22
6	ALGENIST	Multi-Perfecting Detoxifying Exfoliator	38.0	70.78	-32.78
7	ALGENIST	GENIUS Ultimate Anti-Aging Melting Cleanser	38.0	70.78	-32.78

Execution finished without errors.