Arithmetic Happier Than Ever: Billie Eilish Math Mix

Hey! Ready to crunch some numbers? Today, we're going to use our math skills to explore some fun scenarios inspired by Billie Eilish. It's a great way to practice arithmetic concepts like percentages, ratios, and averages.

Warm-up: Quick Calculations (5 mins)

Let's get our brains buzzing. Solve these quickly:

- If a concert ticket costs $80 and the price increases by 10%, what's the new price?
- Billie releases 2 singles before an album with 12 tracks total (including singles). What is the ratio of singles to non-single album tracks?
- If three songs have lengths of 3:15, 2:45, and 4:00 (minutes:seconds), what's their average length in seconds? (Hint: Convert all to seconds first!)

Part 1: Percentages - Streaming Surges & Sold-Out Shows

Percentages help us understand change. Let's imagine some scenarios:

Example 1: Suppose Billie's song 'bad guy' had 1.5 billion streams. If streams increased by 20% after winning an award, how many streams would it have?

Solution:

1. Find 20% of 1.5 billion: (20/100) * 1,500,000,000 = 0.20 * 1,500,000,000 = 300,000,000
2. Add the increase to the original number: 1,500,000,000 + 300,000,000 = 1,800,000,000 (or 1.8 billion) streams.

Example 2: A concert venue holds 15,000 people. If 95% of tickets were sold, how many tickets were sold?

Solution:

(95/100) * 15,000 = 0.95 * 15,000 = 14,250 tickets sold.

Practice Problems:

1. If Billie's Instagram followers increased from 90 million to 108 million, what was the percentage increase?
2. A limited edition t-shirt initially cost $40. It was discounted by 15%. What was the sale price?

Part 2: Ratios - Merch & Music Videos

Ratios compare quantities. Let's look at some examples:

Example 1: For a music video shoot, the ratio of camera crew members to lighting technicians is 3:2. If there are 6 lighting technicians, how many camera crew members are there?

Solution:

Set up a proportion: 3/2 = x/6 (where x is the number of camera crew). Cross-multiply: 2 * x = 3 * 6 -> 2x = 18. Solve for x: x = 18 / 2 = 9 camera crew members.

Example 2: On tour, the ratio of black hoodies sold to green hoodies sold is 5:3. If 150 green hoodies were sold at a concert, how many black hoodies were sold?

Solution:

Set up a proportion: 5/3 = x/150. Cross-multiply: 3 * x = 5 * 150 -> 3x = 750. Solve for x: x = 750 / 3 = 250 black hoodies.

Practice Problems:

1. An album has upbeat songs and ballads in a ratio of 2:1. If there are 4 ballads, how many upbeat songs are there? How many total songs?
2. Billie collaborates with her brother Finneas. Suppose for every 5 songs they write together, Billie writes 1 song completely solo. If they wrote 20 songs together, how many solo songs might Billie have written in that period based on this ratio?

Part 3: Averages - Album Lengths & Chart Performance

Averages (specifically the mean) give us a central value for a set of numbers.

Example 1: Let's say the lengths (in minutes) of 5 songs on an EP are: 3.5, 4.0, 2.5, 3.0, 4.5. What's the average song length?

Solution:

Add the lengths: 3.5 + 4.0 + 2.5 + 3.0 + 4.5 = 17.5 minutes. Divide by the number of songs (5): 17.5 / 5 = 3.5 minutes.

Example 2: Imagine a song's chart position for 4 weeks was #5, #2, #3, #6. What was its average chart position?

Solution:

Add the positions: 5 + 2 + 3 + 6 = 16. Divide by the number of weeks (4): 16 / 4 = 4. The average chart position was #4.

Practice Problems:

1. Hypothetically, if Billie played 3 concerts with attendance of 12,000, 15,000, and 13,500 people, what was the average attendance per concert?
2. Calculate the average length (in seconds) of these three Billie Eilish tracks (approximate lengths): 'bad guy' (3:14), 'Happier Than Ever' (4:58), 'bury a friend' (3:13). Remember to convert to seconds first! (3:14 = 194s, 4:58 = 298s, 3:13 = 193s)

Wrap-up: Create Your Own Problem!

Think about Billie Eilish's music, style, or career. Create one arithmetic word problem (using percentages, ratios, or averages) related to her. Then, solve it! This shows you can apply these concepts creatively.

Example Idea: If 60% of the songs on an album feature a synthesizer, and the album has 15 songs, how many songs feature a synthesizer?

Great job today! Practicing arithmetic with things you find interesting, like Billie Eilish's music, can make learning much more engaging. Keep lookin' for math in the world around you!