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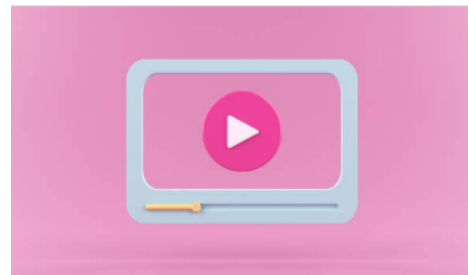


Name: \_\_\_\_\_

## BeatStream Music Subscription Analysis

### Background:

You're part of a student-led marketing team for BeatStream, a new music streaming service targeting teenagers. Your task is to analyze subscription data, pricing, and artist payouts to help make informed decisions about the service.



### Activity:

1. **Subscriber Count Analysis:**

BeatStream offers two types of subscriptions: Free (ad-supported) and Premium (ad-free). The total number of BeatStream users is 5 million. The number of Premium subscribers is 500,000 less than half the number of Free subscribers.

- A. Let  $x$  be the number of Free subscribers and  $y$  be the number of Premium subscribers. Write a system of equations to represent this information.
- B. Solve the system algebraically to determine the number of Free and Premium subscribers.

2. **Revenue Calculation:**

Research the average monthly subscription price for popular music streaming services (like Spotify, Apple Music, etc.). Use this as the price for BeatStream's Premium subscription. Assume Free subscribers generate \$1 per month from ad revenue.

A. BeatStream's Premium Subscription Cost (per month): \_\_\_\_\_

B. Calculate BeatStream's total monthly revenue using your researched price and the subscriber numbers from the previous step.

3. **Artist Payout Analysis:**

BeatStream pays artists \$0.004 per stream from Free accounts and \$0.008 per stream from Premium accounts.

A. Calculate the revenue for an artist who had 1,000,000 streams on each account type.

B. Using the subscriber numbers from part 1, calculate the total monthly payout to all artists. Assume that, on average:

Each Free subscriber streams 300 songs per month

Each Premium subscriber streams 500 songs per month

- C. If BeatStream wants to increase monthly artist payouts by 5% without changing subscription prices, how many new Premium subscribers would they need? (Assume the number of Free subscribers remains constant)

**4. Playlist Curator Analysis:**

BeatStream hires student playlist curators. They pay \$50 for short playlists with 50-100 songs and \$100 for long playlists with 101-200 songs. BeatStream has a budget of \$2000 for playlists this month and wants at least 25 playlists in total.

- A. Write a system of inequalities to represent this situation.

**Define your variables:**

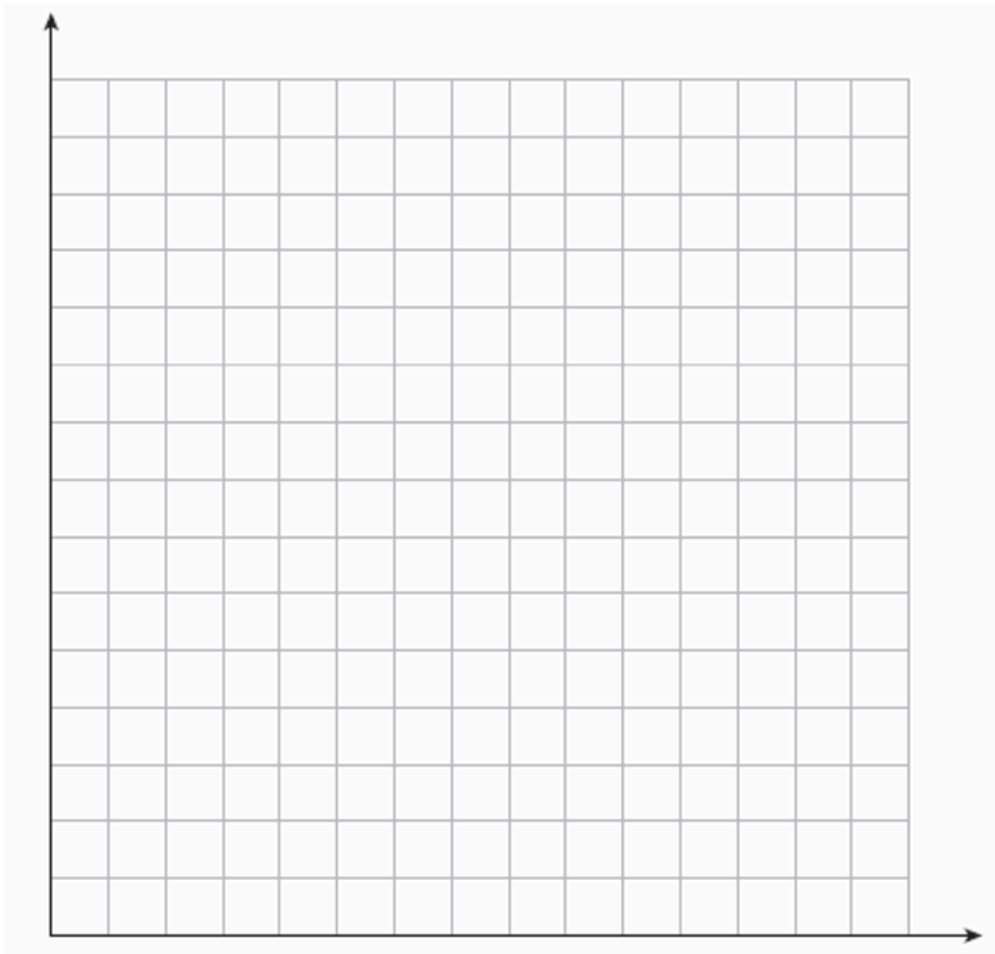
$x =$  \_\_\_\_\_

$y =$  \_\_\_\_\_

**System:**

B. Graph the system of inequalities below. Label the axes accordingly.

C. Find at least three possible combinations of short (50-100 songs) and long (101-200 songs) playlists that satisfy these conditions. Verify algebraically.

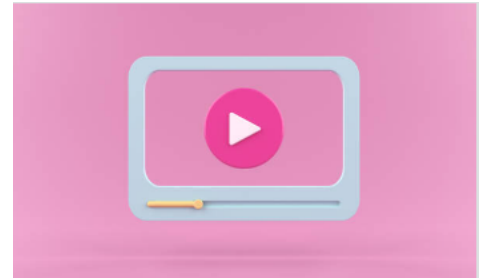


**KEY**

## BeatStream Music Subscription Analysis

### Background:

You're part of a student-led marketing team for BeatStream, a new music streaming service targeting teenagers. Your task is to analyze subscription data, pricing, and artist payouts to help make informed decisions about the service.



### Activity:

#### 1. **Subscriber Count Analysis:**

BeatStream offers two types of subscriptions: Free (ad-supported) and Premium (ad-free). The total number of BeatStream users is 5 million. The number of Premium subscribers is 500,000 less than half the number of Free subscribers.

- C. Let  $x$  be the number of Free subscribers and  $y$  be the number of Premium subscribers. Write a system of equations to represent this information.

$$y = \frac{1}{2}x - 500000$$

$$x + y = 5000000$$

- D. Solve the system algebraically to determine the number of Free and Premium subscribers.

$$x + \frac{1}{2}x - 500000 = 5000000$$

$$\frac{3}{2}x - 500000 = 5000000$$

$$\frac{3}{2}x = 5500000$$

$$x = \frac{11}{3} \approx 3,666,667 \text{ free subscribers}$$

$$y \approx 5000000 - 3,666,667$$

$$y \approx 1,333,333 \text{ premium subscribers}$$

### **Revenue Calculation:**

Research the average monthly subscription price for popular music streaming services (like Spotify, Apple Music, etc.). Use this as the price for BeatStream's Premium subscription. Assume Free subscribers generate \$1 per month from ad revenue.

A. BeatStream's Premium Subscription Cost (per month): **Answers Vary**  
**Sample: \$12/ month**

B. Calculate BeatStream's total monthly revenue using your researched price and the subscriber numbers from the previous step.

$$\text{Revenue} \approx 12(1,333,333) + 1(3,666,667)$$

$$\text{Revenue} \approx 19,666,663 \text{ dollars}$$

### 4. **Artist Payout Analysis:**

BeatStream pays artists \$0.004 per stream from Free accounts and \$0.008 per stream from Premium accounts.

D. Calculate the revenue for an artist who had 1,000,000 streams on each account type.

$$\text{Free: } 0.004(1,000,000) = \$4,000$$

$$\text{Premium: } 0.008(1,000,000) = \$8,000$$

$$\text{Revenue for Artist: } \$12,000$$

E. Using the subscriber numbers from part 1, calculate the total monthly payout to all artists. Assume that, on average:

Each Free subscriber streams 300 songs per month

Each Premium subscriber streams 500 songs per month

$$\text{Payout: } P = 0.004(300)(3,666,667) + 0.008(500)(1,333,333)$$

$$P = 9,733,332 \text{ dollars}$$

F. If BeatStream wants to increase monthly artist payouts by 5% without changing subscription prices, how many new Premium subscribers would they need? (Assume the number of Free subscribers remains constant)

$$9,733,332(1.05) = 10,219,999$$

$$10,219,999 - 9,733,332 = 486,667 \text{ dollars}$$

$$486,667 = 0.008(500)(n)$$

$$n \approx 121,667 \text{ more subscribers}$$

#### 4. Playlist Curator Analysis:

BeatStream hires student playlist curators. They pay \$50 for short playlists with 50-100 songs and \$100 for long playlists with 101-200 songs. BeatStream has a budget of \$2000 for playlists this month and wants at least 25 playlists in total.

D. Write a system of inequalities to represent this situation.

**Define your variables:**

$x$  = # of short playlists

$y$  = # of long playlists

**System:**

$$50x + 100y \leq 2000$$

$$x + y \geq 25$$

E. Graph the system of inequalities in the space on the next page. Label the axes accordingly.

\*System was graphed using desmos.com



F. Find at least three possible combinations of short (50-100 songs) and long (101-200 songs) playlists that satisfy these conditions. Verify algebraically.

30 short  
playlists  
5 long  
playlists

20 short  
playlists  
10 long  
playlists

10 short  
playlists  
15 long  
playlists