THE STRING GAME

Materials

Prepare a chart showing all of the attributes to be used in the game and prepare a card for each attribute to form a "face-down" set. Prepare game pieces, one

0r each of the numbers that are listed below. Put magnetic material or loops of masking tape on the pieces and the string cards so that they will adhere to the board.
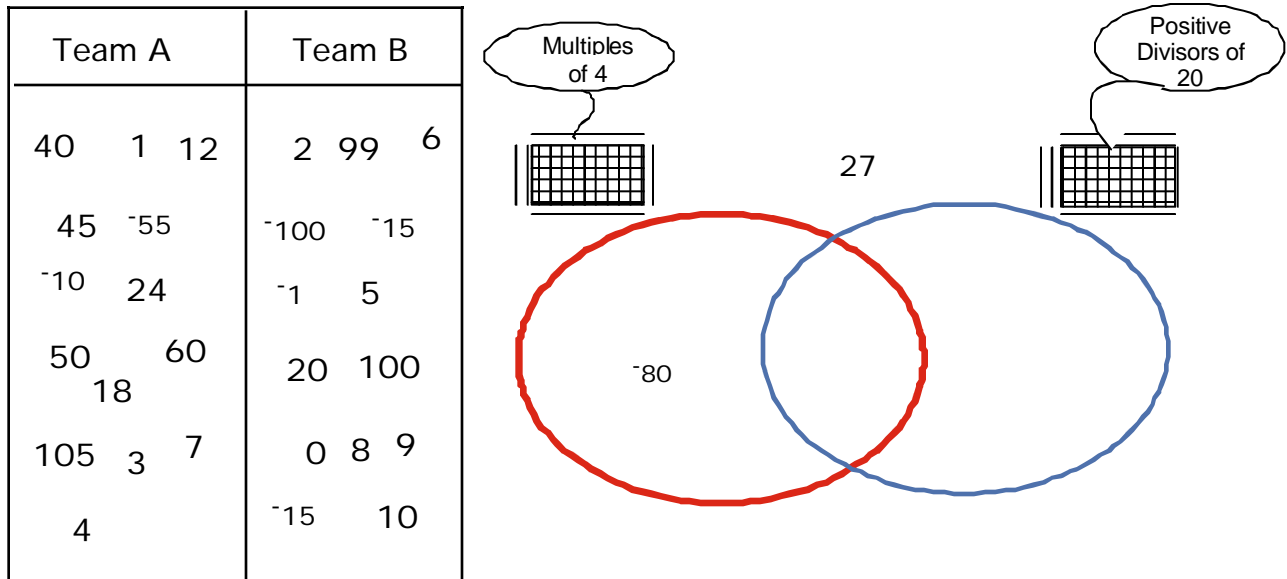
Game Pieces

⁻100	⁻80	⁻55	⁻15	⁻10	⁻15
⁻1	0	1	2	3	4
5	6	7	8	9	10
12	18	20	24	27	40
45	50	60	99	100	105

Multiples of 2	Multiples of 3	Multiples of 4	Multiples of 5
Multiples of 10	Positive Divisors of 12	Positive Divisors of 18	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 27	Larger than 50	Larger than ⁻10
Smaller than 50	Smaller than ⁻10	Odd Numbers	Positive Prime Numbers

<u>Preparation</u>

Draw two (or three) large overlapping strings on the board using two (or three) different colors. Next to each string attach a string card face-down. Place an even number (two or four) of the game pieces correctly in the string picture to provide a basis .(other than guessing) for plays early In the game. Divide the rest of the game, pieces evenly into two sets, one for each of the competing teams. The illustration below shows a sample set-up for a game; bubbles indicate the hidden labels.

Team A	Team B
40 1 12	2 99 6
45 ⁻55	⁻100 ⁻15
⁻10 24	⁻1 5
50 60 18	20 100
105 3 7	0 8 9
4	⁻15 10

Multiples of 4

Positive Divisors of 20

27

⁻80

Object of the game

Each team tries to place its game pieces correctly in the string picture according to the face-down string cards. The winning team is the one that identifies the facedown cards correctly after playing according to the rules.

Rules of the game

1)   The students play the game in silence. Each student should have the opportunity to analyze the game alone. Infringement of this rule by anyone is penalized by the talker's team losing its next turn.

2)   The teams alternate and the members take turns within each team. A player comes to the board and selects a. piece from the team's collection to place in one of the regions of the string picture.

3)   You are the judge. If the piece is correctly placed, say "yes". The piece remains an the string picture and the player immediately has a second turn (no player may have more than two consecutive turns) . If the* piece is in correctly placed, say "no". The player returns the piece to the team's unplayed collection and play passes to the other team. As an aid in judging, prepare a crib-sheet showing the correct position of each game piece. if at any time you discover that you have made an error, say so immediately and rectify the mistake. Either move -an incorrectly placed piece whose position you had approved to its correct region or replace on the string picture a correctly placed piece that-you-had-rejected because you had disapproved its position...

4)   When a team has correctly placed all of its pieces, the player who placed the last piece may thereupon attempt to Identify each of the string cards. There are two levels of acceptability dependent on the experience of the students In playing the game. In the first case, accept and verify a correct Identification. of a string and continue the game until the other, string or strings are identified. In the second stage, require all of the strings be identified correctly at once.

If a team has exhausted its stock, of game pieces and the strings have not been identified, then the team continues on its turn to attempt to identify the -strings, while the other team works to place its game pieces.

Analysis Sheets on next Page.

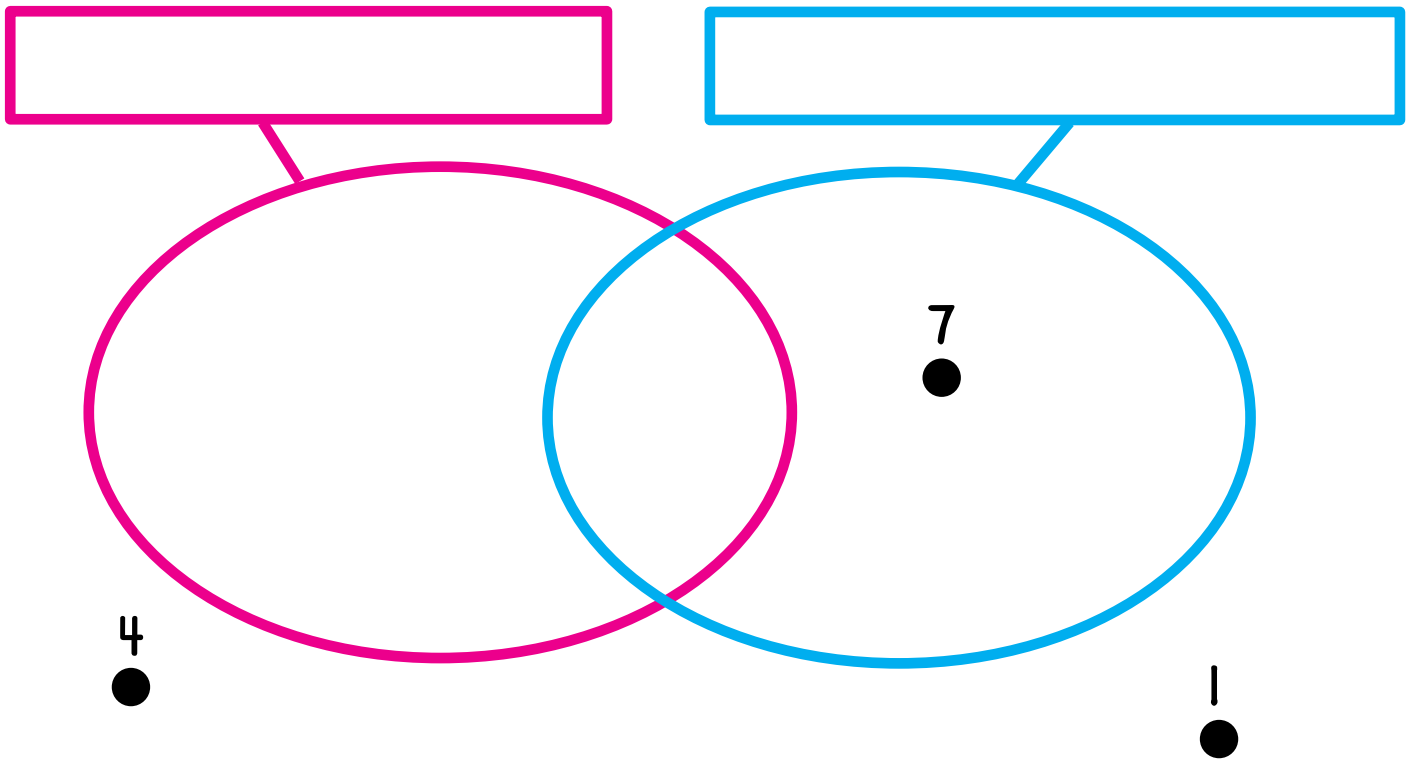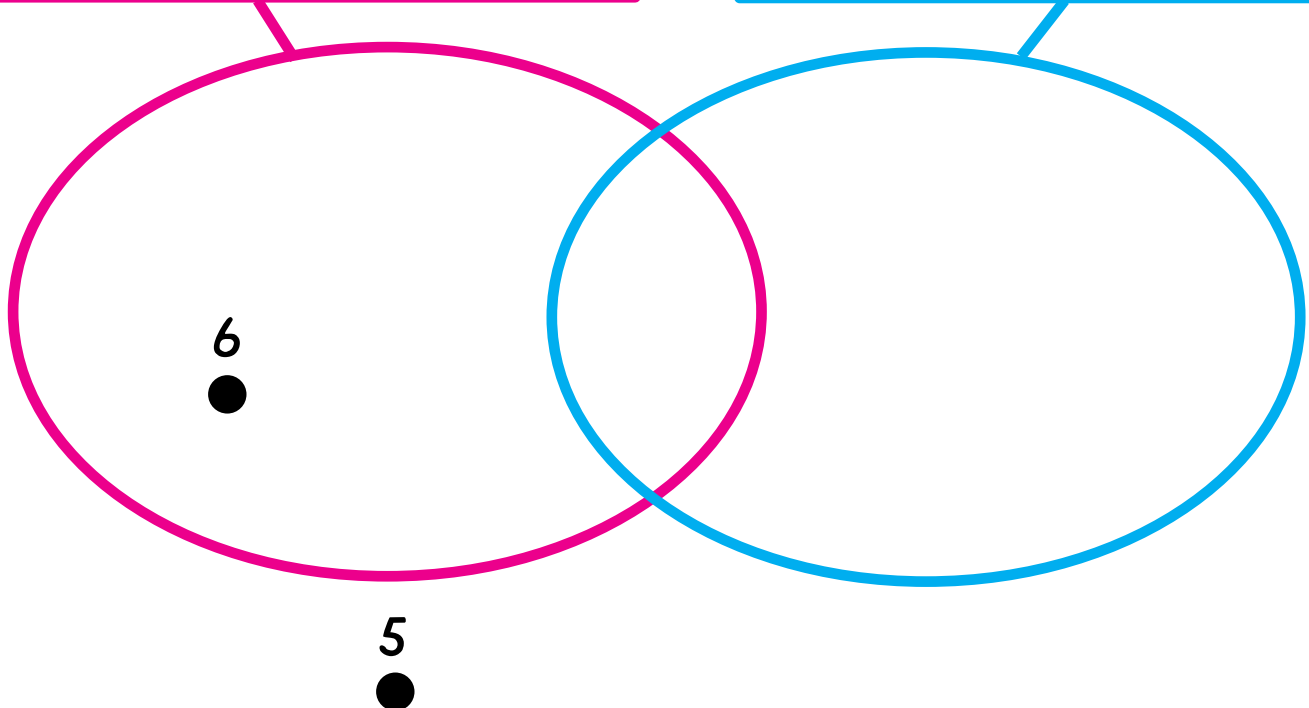| RED	BLUE		RED	BLUE
Multiples of 2	Multiples of 2		Multiples of 2	Multiples of 2
Multiples of 3	Multiples of 3		Multiples of 3	Multiples of 3
Multiples of 4	Multiples of 4		Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5		Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10		Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers		Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers		Positive Prime Numbers	Positive Prime Numbers
Larger than 50	Larger than 50		Larger than 50	Larger than 50
Smaller than 50	Smaller than 50		Smaller than 50	Smaller than 50
Larger than -10	Larger than -10		Larger than -10	Larger than -10
Smaller than -10	Smaller than -10		Smaller than -10	Smaller than -10
Positive Divisors of 12	Positive Divisors of 12		Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18		Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20		Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24		Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27		Positive Divisors of 27	Positive Divisors of 27

The red label is one of these:

Positive prime numbers
Positive divisors of 12
Multiples of 3
Greater than $\widehat{20}$
Less than 20
Odd numbers

The blue label is one of these:

Positive prime numbers
Positive divisors of 12
Multiples of 3
Greater than $\widehat{20}$
Less than 20
Odd numbers

Label the strings.

7
●

4
●

1
●

The red label is one of these:

Positive prime numbers
Positive divisors of 20
Multiples of 4
Greater than $\widehat{10}$
Less than 40
Positive divisors of 24

The blue label is one of these:

Positive prime numbers
Positive divisors of 20
Multiples of 4
Greater than $\widehat{10}$
Less than 40
Positive divisors of 24

Label the strings.

6

●

5

●

The red label is one of these:

The blue label is one of these:

Multiples of 2
Multiples of 4
Multiples of 5
Positive divisors of 24
Positive divisors of 20
Greater than $\widehat{10}$
Less than 10

Multiples of 2
Multiples of 4
Multiples of 5
Positive divisors of 24
Positive divisors of 20
Greater than $\widehat{10}$
Less than 10

Label the strings.

Name _____

Use the clues in the picture to cross out labels that the strings cannot have. Some are done for you. Then label the strings.
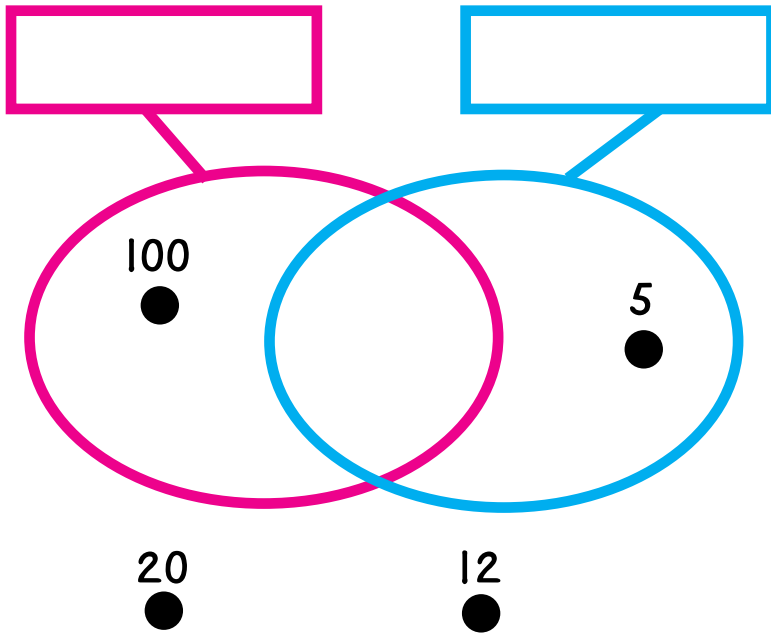
The RED label is one of these:	The BLUE label is one of these:
~~Multiples of 2~~	~~Multiples of 2~~
~~Multiples of 3~~	~~Multiples of 3~~
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	~~Multiples of 10~~
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
~~Greater than 10~~	Greater than 10
Less than 10	Less than 10
~~Positive Divisors of 12~~	~~Positive Divisors of 12~~
Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
~~Positive Divisors of 27~~	~~Positive Divisors of 27~~

Name _____

Cross out the labels that the strings cannot have.

The label for the red string is

[   ] .

The label for the blue string could be

[   ] or [   ] .

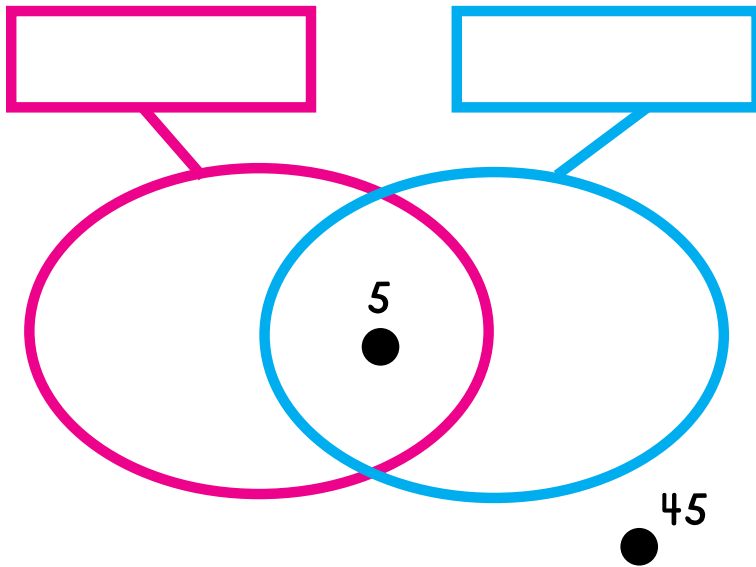| Red	Blue
Multiples of 2	Multiples of 2
Multiples of 3	Multiples of 3
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
Greater than $\widehat{10}$	Greater than $\widehat{10}$
Less than $\widehat{10}$	Less than $\widehat{10}$
Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27

Exactly four of the numbers below cannot be put in the string picture because the label of the blue string is not known. Circle these four numbers. Put all of the other numbers in the string picture.

$\widehat{80}$ $\widehat{15}$ 2   3   7   24   50   60   99   105

Cross out the labels that the strings cannot have.

Red	Blue
Multiples of 2	Multiples of 2
Multiples of 3	Multiples of 3
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
Greater than $\widehat{10}$	Greater than $\widehat{10}$
Less than $\widehat{10}$	Less than $\widehat{10}$
Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27

The label for the red string could be

[ ] or [ ] .

The label for the blue string could be

[ ] or [ ] .

Some of these numbers cannot be put in the string picture because the string labels are not known. Circle them. Put the others in the string picture.
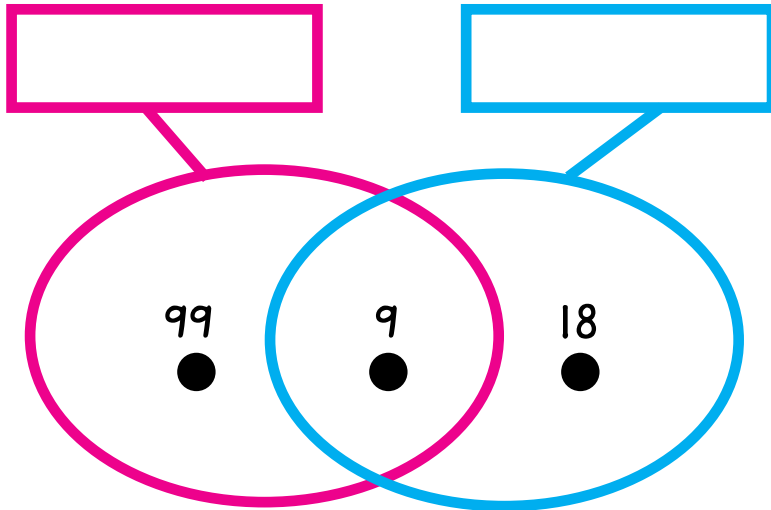
$\widehat{55}$ $\widehat{15}$ 2   3   4   8   9   10   24   105

It is your turn in The String Game. Assume the strings have different labels. By playing exactly one of these numbers you can find both of the string labels, even if you get a NO answer. Circle the number you should play.

20   100   6   55 $\widehat{1}$

Cross out the labels that the strings cannot have.

99 •   9 •   18 •

The label for the red string is

[   ] .

The label for the blue string could be

[   ] or [   ] .

Red	Blue
Multiples of 2	Multiples of 2
Multiples of 3	Multiples of 3
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
Greater than 10̂	Greater than 10̂
Less than 10̂	Less than 10̂
Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27

It is your turn in The String Game. You want to find the label of the blue string.

1) You can find the label for the blue string by playing exactly one of these numbers, even if you get a NO answer. Circle the number that you should play.
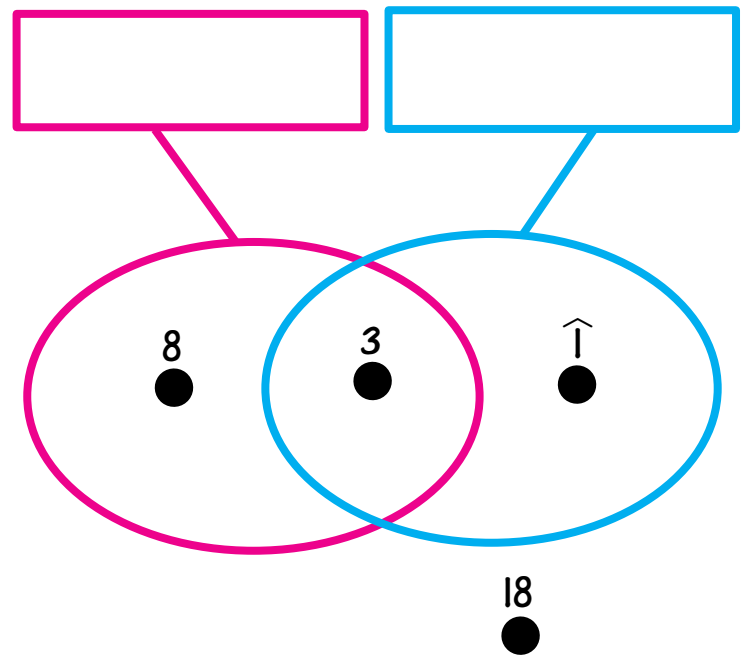
3   105   60   7   2

2) Repeat problem (1) but with these numbers.

20   100   6   55   1

Name _____

Use the clues in the picture to cross out labels that the strings cannot have. Some are done for you. Then label the strings.
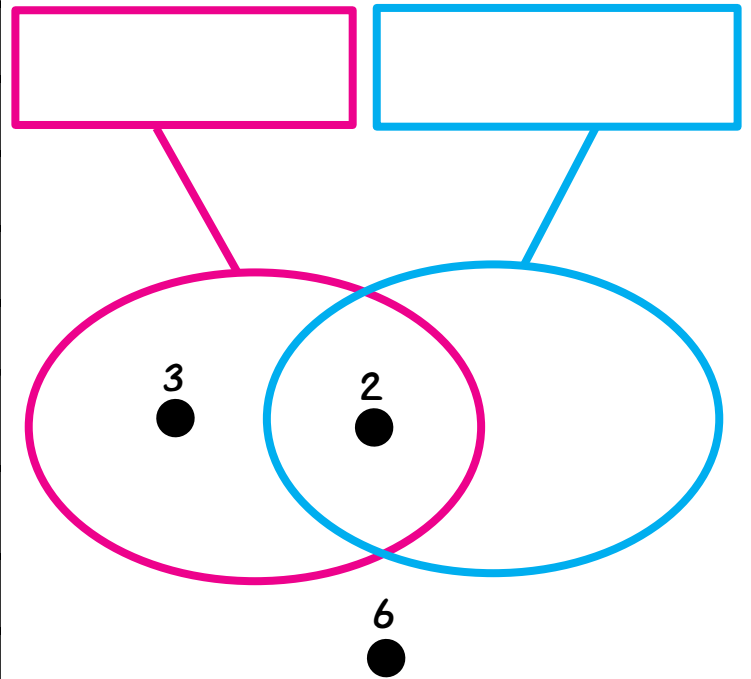
The RED label is one of these:	The BLUE label is one of these:
~~Multiples of 2~~	~~Multiples of 2~~
~~Multiples of 3~~	~~Multiples of 3~~
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
Greater than 10̂	Greater than 10̂
Less than 10̂	Less than 10̂
Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27

Name _____

Use the clues in the picture to cross out labels that the strings cannot have. Then label the strings.

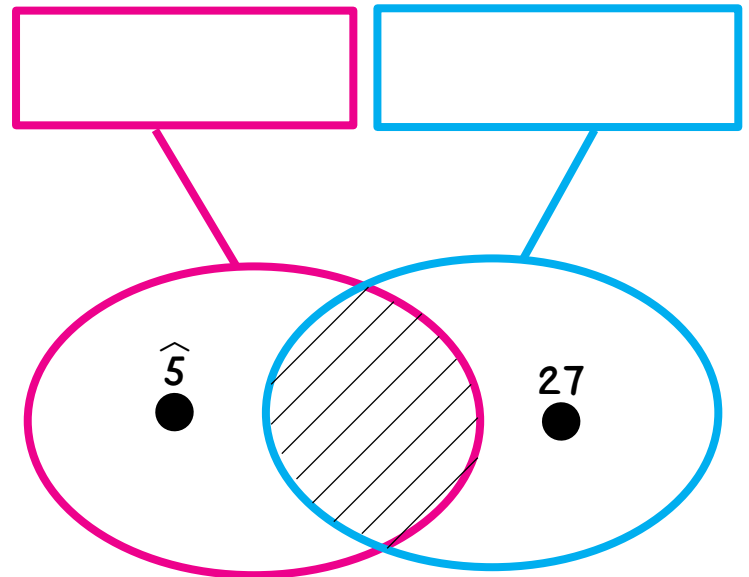| The RED label is one of these:	The BLUE label is one of these:
Multiples of 2	Multiples of 2
Multiples of 3	Multiples of 3
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
Greater than $\widehat{10}$	Greater than $\widehat{10}$
Less than $\widehat{10}$	Less than $\widehat{10}$
Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27

Name _____

Use the clues in the picture to cross out labels that the strings cannot have. The hatching is a clue. Then label the strings.

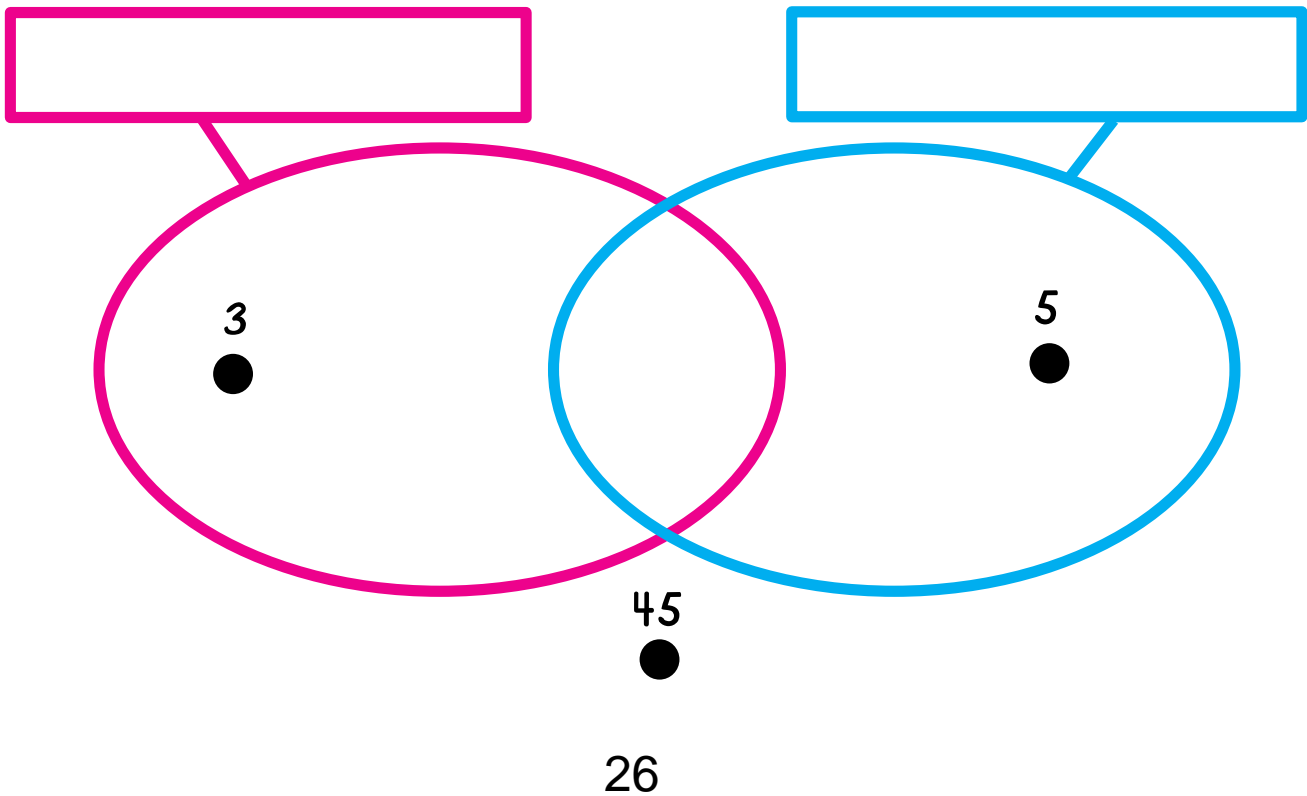| The RED label is one of these:	The BLUE label is one of these:
Multiples of 2	Multiples of 2
Multiples of 3	Multiples of 3
Multiples of 4	Multiples of 4
Multiples of 5	Multiples of 5
Multiples of 10	Multiples of 10
Odd Numbers	Odd Numbers
Positive Prime Numbers	Positive Prime Numbers
Greater than 50	Greater than 50
Less than 50	Less than 50
Greater than $\widehat{10}$	Greater than $\widehat{10}$
Less than $\widehat{10}$	Less than $\widehat{10}$
Positive Divisors of 12	Positive Divisors of 12
Positive Divisors of 18	Positive Divisors of 18
Positive Divisors of 20	Positive Divisors of 20
Positive Divisors of 24	Positive Divisors of 24
Positive Divisors of 27	Positive Divisors of 27

The red label is one of these:

Positive prime numbers
Multiples of 3
Multiples of 5
Positive divisors of 12
Positive divisors of 20
Greater than $\widehat{10}$
Less than 100
Odd numbers

The blue label is one of these:

Positive prime numbers
Multiples of 3
Multiples of 5
Positive divisors of 12
Positive divisors of 20
Greater than $\widehat{10}$
Less than 100
Odd numbers

Label the strings.

3

5

45

The red label is one of these:

| Multiples of 3 |
| Multiples of 5 |
| Positive divisors of 18 |
| Positive divisors of 24 |
| Greater than 10 |
| Less than 10 |
| Odd numbers |

The blue label is one of these:

| Multiples of 3 |
| Multiples of 5 |
| Positive divisors of 18 |
| Positive divisors of 24 |
| Greater than 10 |
| Less than 10 |
| Odd numbers |

Label the strings.

27 3 12