

SET THEORY & LOGICAL REASONING PRACTICE EXAM

Math 30-2

Multiple Choice & Numerical Response*Identify the choice that best completes the statement or answers the question.*

1. Which of the following phrases describes an empty set?
 - A. Common factors of 3 and 7
 - B. Prime numbers that are even
 - C. Multiples of 5 that are less than 10
 - D. Perfect squares less than 20 that are divisible by 5

2. Which of the following rows includes two groups that would be an example of disjoint sets?

Row	Group 1	Group 2
A.	People who regularly drink coffee	People who regularly drink tea
B.	People who have a home phone line	People who have a cellular phone line
C.	The set of all prime numbers	The set of all even numbers
D.	The set of all multiples of 5	The set of all factors of 24

Use the following information to answer the next question.

Vehicles with a sunroof are represented by $\{S\}$ and vehicles with a hands-free phone system are represented by $\{P\}$.

3. Which of the following illustrates $(S \cap P)$?
 - A. A sunroof or a hands-free phone system
 - B. A sunroof and not a hands-free phone system
 - C. Not a sunroof or not a hands-free phone system
 - D. Not a sunroof and not a hands-free phone system

Use the following information to answer the next four questions.

Students in a particular high school were surveyed to determine the subjects in which they were currently enrolled. The table below represents the data that was collected.

Courses Enrolled In	Number of Students
Math only	28
Art only	33
Math and Art	17
Neither course	20

4. The number of students in the universal set is
- A. 61
 - B. 64
 - C. 78
 - D. 98

NR 1

The number of students taking Art is _____.

NR 2

The number of students **not** taking Math is _____.

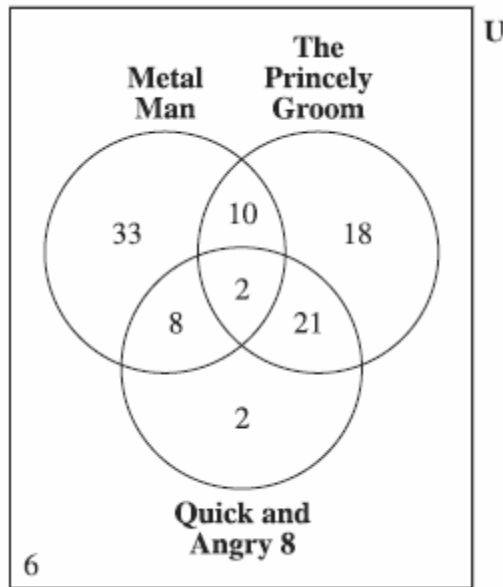
5. The number of students taking Math or Art is
- A. 17
 - B. 61
 - C. 78
 - D. 98

Use the following information to answer the next four questions.

A group of 100 students was surveyed about movies that they have seen, as shown below.

- 2 people saw all three movies
- 12 people saw “Metal Man” and “The Princely Groom”
- 53 people saw “Metal Man”
- 10 people saw “Metal Man” and “Quick and Angry 8”
- 18 people saw “The Princely Groom” only
- 23 people saw “The Princely Groom” and “Quick and Angry 8”
- 6 people did not see any of the movies

Jason started to organize the results in the Venn diagram shown below.



6. The number of people who saw “The Princely Groom” is
- A. 18
 - B. 20
 - C. 51
 - D. 53

NR 3

The number of people who saw “Metal Man” and “The Princely Groom” but **not** “Quick and Angry 8” is _____.

7. The number of people who saw “Metal Man” only is
- A. 33
 - B. 20
 - C. 51
 - D. 53
8. The number of people who saw “Metal Man” or “Quick and Angry 8” is
- A. 76
 - B. 10
 - C. 43
 - D. 98

Use the following information to answer the next two questions.

Two Sets

- $A = \{\text{prime numbers less than } 20\}$
- $B = \{\text{factors of } 20\}$

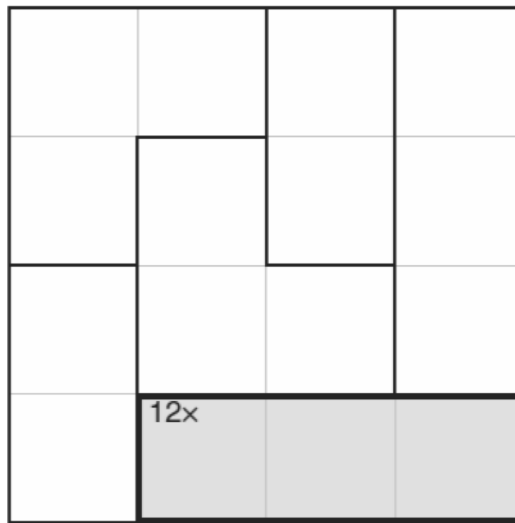
9. The union of sets A and B is
- A. $\{2, 5\}$
 - B. $\{2, 4, 5, 10\}$
 - C. $\{1, 2, 3, 4, 5, 7, 10, 11, 13, 17, 19, 20\}$
 - D. $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$
10. The set $C = A \cap B$ is
- A. $\{2, 5\}$
 - B. $\{2, 4, 5, 10\}$
 - C. $\{1, 2, 3, 4, 5, 7, 10, 11, 13, 17, 19, 20\}$
 - D. $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

11. The word SPOT compares to STOP as the number 5 381 compares to the number

- A. 1 385
- B. 5 138
- C. 1 835
- D. 5 183

Use the following information to answer the next question

The diagram below shows a 4 by 4 KenKen puzzle. John is about to start the puzzle.



12. In how many different ways can John fill in the shaded section?

- A. 3
- B. 6
- C. 4
- D. 12

Written Response

Use the following information to answer the next question

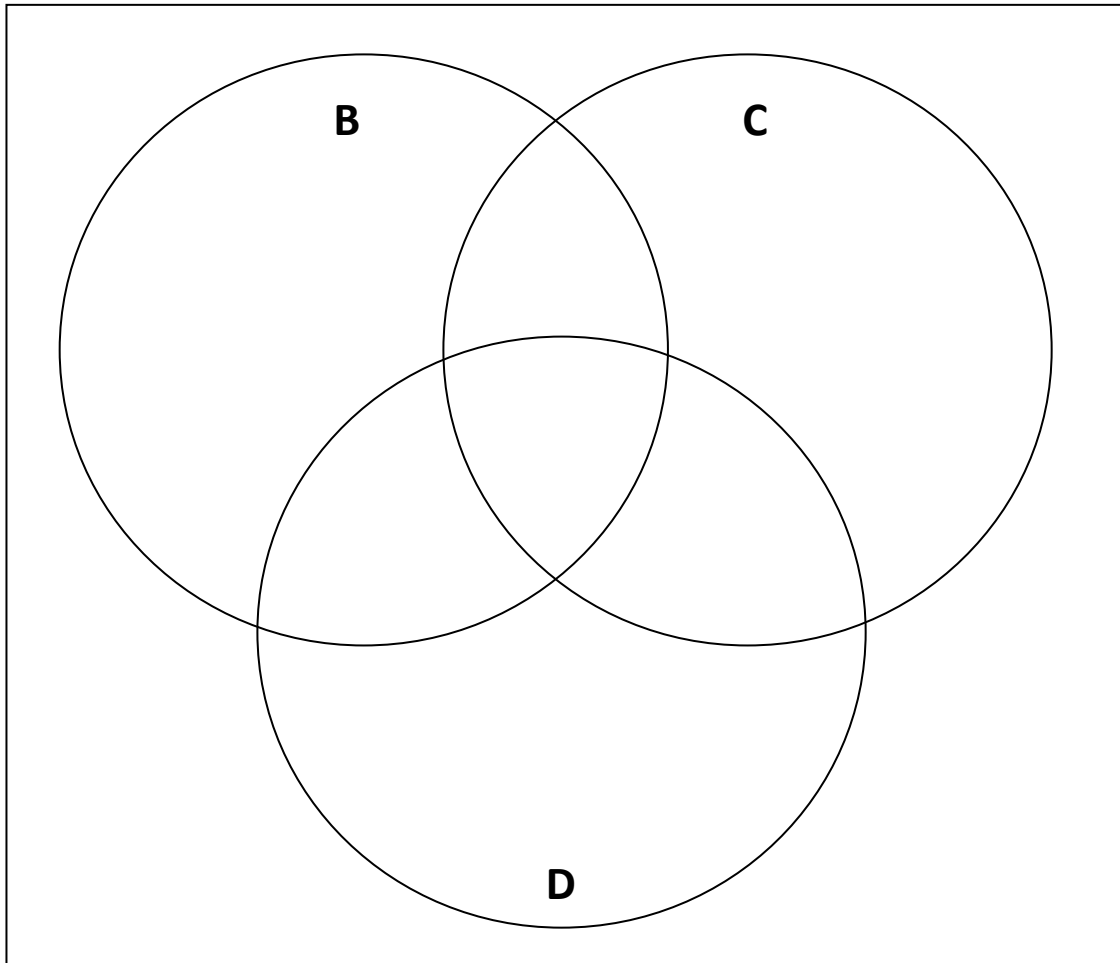
Use the following clues to answer the question below.

- $D = \{\text{dog}\}$; $C = \{\text{cat}\}$; $B = \{\text{bird}\}$
- 28 children have a dog, a cat, or a bird
- 13 children have a dog
- 13 children have a cat
- 13 children have a bird
- 4 children have only a dog and a cat
- 3 children have only a dog and a bird
- 2 children have only a cat and a bird
- No child has two of each type of pet



- Determine how many children have a cat, a dog, and a bird.

- Using the information, complete the Venn Diagram



- How many children have only one pet?

Answer Key

1. D
2. D
3. D
4. D
5. C
6. C
7. A
8. A
9. C
10. A
11. D
12. B

NR 1 – 50

NR 2 – 53

NR 3 – 10