

Hybleland L9-Lesson 18 Set I-Definition and Subsets-Assignment

Practice 1.

Denote a new operation $A * B = \{x \mid x = x_1 + x_2, x_1 \in A, x_2 \in B\}$.

If $A = \{1, 2, 3\}$ and $B = \{1, 2\}$, then the sum of all the elements in $A * B$ is ()

- A . 9 B . 18 C . 14 D . 21

Practice 2.

Given set $A = \{t^2 + s^2 \mid t, s \in \mathbf{Z}\}$, and $x \in A, y \in A$. Which of the following is correct?

- A . $x + y \in A$ B . $x - y \in A$ C . $xy \in A$ D . $\frac{x}{y} \in A$

Practice 3.

If sets $M = \{x \mid x = \frac{n}{3} + \frac{1}{6}, n \in \mathbf{Z}\}$, $N = \{x \mid x = \frac{n}{6} + \frac{1}{3}, n \in \mathbf{Z}\}$, then ()

- A . $M = N$ B . $M \subset N$ C . $N \subset M$ D . $M \cap N = \emptyset$

Practice 4.

If $a \in M$, then $\frac{1+a}{1-a} \in M$. When $a = 2$, set $M = \underline{\hspace{2cm}}$. (List all the elements in roster form.)

Practice 5.

If there is only one element in set $A = \{x \mid ax^2 + 2x + 1 = 0\}$, then the value of real number a is _____.

Practice 6.

Given $A = \{x \mid a \leq x \leq 4a - 9\}$, $B = \{x \mid x^2 + x + a \leq 0\}$, $C = \{x \mid x^2 - x + 2a - 1 < 0\}$ and at least one of A , B and C is not a non-empty set, the value range of a is _____.

Practice 7.

Given the set $A = \{x \in \mathbf{R} \mid ax^2 - 3x - 4 = 0\}$

(1) If there are two elements in A , find the value range of real number a .

(2) If there are at most one element in A , find the value range of real number a .

Practice 8.

There are just 2 integers in the elements of set $A = \{x \mid b < x < 3b - 1\}$. Find the value range of b .

Practice 9.

$C(A)$ can be used to show the number of elements in the non-empty set A . Define

$$A * B = \begin{cases} C(A) - C(B), & C(A) \geq C(B) \\ C(B) - C(A), & C(A) < C(B) \end{cases} . \text{ If } A = \{1, 2\}, B = \{x \mid (x^2 + ax)(x^2 + ax + 2) = 0\}, \text{ and}$$

$A * B = 1$, also, all the possible values of real number a form the set S , then $C(S) = (\quad)$

Practice 10.

Fill in the blanks with the most proper signs ($\in, \notin, \subseteq, \supseteq, =, \neq$)

(1) \emptyset $\underline{\hspace{1cm}}$ $\{0\}$;

(2) 2 $\underline{\hspace{1cm}}$ $\{(1, 2)\}$;

(3) 0 $\underline{\hspace{1cm}}$ $\{x \mid x^2 - 2x + 5 = 0\}$

(4) $\{3, 5\}$ $\underline{\hspace{1cm}}$ $\{x \mid x^2 - 8x + 15 = 0\}$;

(5) $\{3, 5\}$ $\underline{\hspace{1cm}}$ \mathbf{N} ;

(6) $\{x \mid x = 2k, k \in \mathbf{N}\}$ $\underline{\hspace{1cm}}$ $\{x \mid x = 4n, n \in \mathbf{N}\}$;

(7) $\{x \mid x = 4k + 1, k \in \mathbf{Z}\}$ $\underline{\hspace{1cm}}$ $\{x \mid x = 4k - 3, k \in \mathbf{Z}\}$

Practice 11.

(1972, AHSME) Find the number of solutions to $\{1, 2\} \subset X \subset \{1, 2, 3, 4, 5\}$, where X is a set.

Practice 12.

The number of sets M that satisfy $\{a, b\} \subseteq M \subset \{a, b, c, d, e\}$ is ().

A . 3 B . 7 C . 8 D . 32

Practice 13.

The number of subset of $\{1, 2, 3\}$ is _____

Practice 14.

If set $P = \{(x, y) \mid x + y < 5, x \in \mathbf{N}^*, y \in \mathbf{N}^*\}$, then the number of proper subset of P is ().

A . 6 B . 62 C . 63 D . 64

(Hint: A is a proper subset of P means A is a subset of P but not equal to P)

Practice 15.

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There are several sets of three different numbers whose sum is 15 which can be chosen from $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$. How many of these sets contain a 5?

A. 3 B. 4 C. 5 D. 6 E. 7

Practice 16.

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How many subsets of $\{2, 3, 4, 5, 6, 7, 8, 9\}$ contain at least one prime number?

A. 128 B. 192 C. 224 D. 240 E. 256

Practice 17.

(1989, MATHCOUNTS) How many 3 element subsets can be formed from a set of 5 elements?

Practice 18.

(1988, MATHCOUNTS) A is a set with N elements. For what value of N are there 11 times as many different subsets of A of size six as there are subsets of A of size three?

Practice 19.

How many subsets of $\{n \mid n \text{ is a multiple of 3 less than } 100\}$
are also subsets of $\{n \mid n \text{ is a multiple of 4 less than } 100\}$