

Homework 2 solutions

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Levin 0.3: 4: $\{2, 4\}$

5 : $\{1, 2, 3, 4, 5, 6, 8, 10\}$

10: a: $\{4, 6, 8, 10, 12\}$

b. $\{0, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20, 22 \dots\}$ (which is really cheating, or $\{x \in \mathbb{N} : 3 \leq x \leq 13 \text{ or } x \text{ is even}\}$ (better)

c The two sets have no common element. They do have an intersection, which is \emptyset , the set with no elements (the empty set). $\{\emptyset\}$ is not correct notation for the empty set, and writing this will cost points.

d the set of all natural numbers \mathbb{N} . $\{x \in \mathbb{N}\}$, a popular answer for some reason, is not notation for a set.

A set notation with braces $\{\dots\}$ should have between the braces either a comma-separated list of elements or a restriction $x \in A$, followed by a colon, followed by a statement about the variable x (there is an alternative where there is a complex notation instead of x and the statement is about the variables appearing in the complex notation, as for example $\{(a, b) \in \mathbb{N} \times \mathbb{N} : a \leq b\}$). A notation cannot merge both a restriction/condition and a list (something people tried in part b).

16: $(A \setminus B) \cup (B \setminus A)$

18: 10 singletons, 45 doubletons

Lovasz 2.6: It has Alice as an element and $\{1\}$. 1 is not an element.

2.10: $\{Alice, Diane, Eve\}$ itself works; any three sets containing these three elements and possibly some others. I marked off slightly for

answers which supposed information we do not have; I did allow you to assume that these were the students of those names at Alice's party.

2.11: $\{a, c, d, e\}, \{a, c, d\}, \{a, c, e\}, \{a, c\}, \{a, d, e\}, \{a, d\}, \{a, e\}, \{a\}$

2.15: 9,10,14 are possible, 4 and 20 are not

2.17: a $\{1, 3\}$

b \emptyset . It is not correct to say that there is no intersection. $\{\emptyset\}$ is not the empty set.

c $\{2\}$