Lecture 1 - Homework

Question 1. Come up with three sets and write them down.

Question 2. Simply the following sets as much as possible.

(a) $\{3, 2, 1, 1, 2, 3\}$

(b) $\{A, B, B, C, D, D\}$

(c) $\{1, 2, 3, 4\}$

Question 3. Write down **three** equivalent representations of the set $S = \{1, 2, 3\}$. (**Hint:** Remark 1.1)

Question 4. What are dots $(\ldots)$ used for in sets?

Question 5. Let $S = \{4, 5, 6, \triangle\}$. Which of the following choices are **True?**

(a) $5 \in S$

(b) $\circ \notin S$

(c) $\triangle \notin S$

(d) $(4 + 6) \in S$

Question 6. Is $\sqrt{2} \in \mathbb{Q}$? Explain your answer.

Question 7. Why do you think the empty set $(\emptyset)$ might be important in set theory?

Question 8. Describe the following sets symbolically.

(a) All integers that are greater than or equal to -2.

(b) All rational numbers that are not zero.

(c) All the real numbers that are greater than or equal to -2 and less than 6.

Question 9. Write down the elements of the following sets.

(a) $A = \{x \in \mathbb{Z} \mid x \leq -5\}$

(b) $B = \{x \in \mathbb{Z} \mid 1 < x \leq 6\}$

(c) $T = \{y \in \mathbb{Z} \mid y^2 = 4\}$

Question 10. In mathematics, when we add two sets we basically merge all elements into a **single** set. Therefore, determine the following sum,

$$\{3, 4, 5\} + \{3, 6, 8\}.$$

Question 11. (Challenge) Describe the set of all odd integers symbolically.