

Here are some sets. *Every set is a subset of \mathbb{Z} .*

$$A = \{3x : x \in \mathbb{N}\},$$

$$B = \{3x + 21 : x \in \mathbb{N}\},$$

$$C = \{x + 7 : x \in \mathbb{N}\},$$

$$D = \{3x : x > 7\},$$

$$E = \{x : x \in \mathbb{N}\},$$

$$F = \{3x - 21 : x \in \mathbb{N}\},$$

$$G = \{x : x > 7\}.$$

Which of the following sets are equal? Explain why, or why not. Give a proof! Your proof should not involve making a list of elements of the set. If you use induction, did you formulate an induction statement?

1. $D = E$?
2. $C = G$?
3. $A \cap E = B$?
4. $A \cap C = B$?
5. $C \cap F = A$?
6. $C \cap F = B$?
7. $F \cap G = D$?
8. $F \cap G = B$?