

MCS-236 Non-textbook Homework Exercise 1

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Suppose that all you know about the set of integers A is that $|A| = n$. Two further sets are defined as follows:

$$B = \{a : a \in A \text{ and } a \text{ is odd}\}$$

$$C = A \times B$$

Even though you don't know much about the set A , you know enough to put bounds on the cardinalities $|B|$ and $|C|$. As an example of how you could express these bounds, suppose you figured out that the set B must have at least 1 element and surely has no more than twice as many elements as A . (This is just an example. It isn't true.) In this case, you would write $1 \leq |B| \leq 2n$.

Write a paragraph in which you state and justify correct bounds for the cardinalities $|B|$ and $|C|$. Your justification should be based on examples of how the set A could be constructed so as to minimize or maximize the cardinalities of B and C .