1. Write down a rule method description and a roster description of the set of all the U.S. states the names of which start with the letter M.

2. Give an example of a set which is easy to describe using the rule method but impossible to describe using the roster method.

3. Express the following sets via the roster method:
   (a) \( A = \{ x \in \mathbb{R} \mid x^3 + x^2 - 12x = 0 \} \)
   (b) \( B = \{ a \in \mathbb{R} \mid f(x) = \frac{x}{x^2-3x+2} \text{ is discontinuous at } x = a \} \)

4. Write down the power set of each of the following sets:
   (a) \( \emptyset \)
   (b) \( \{ \emptyset \} \)
   (c) \( \{ \emptyset, \{ \emptyset \} \} \)

5. For each \( n \in \mathbb{N} \), let \( n\mathbb{Z} \) denote the set of all integral multiples of \( n \).
   (a) Write down a pattern description of the set \( 6\mathbb{Z} \).
   (b) Write down a rule description of the set \( 6\mathbb{Z} \).
   (c) Calculate \( 6\mathbb{Z} \cap 9\mathbb{Z} \).

6. Which of the following are mathematical statements?
   (a) \( ax^2 + bx + c = 0 \).
   (b) There exists \( x \) such that \( ax^2 + bx + c = 0 \).
   (c) \( 2 = 3 \).
   (d) \( 2 \neq 3 \).
   (e) \( 3 + n + n^2 \).
   (f) \( (x + y)^2 = x^2 + 2xy + y^2 \).
   (g) For all \( x, y \), \( (x + y)^2 = x^2 + 2xy + y^2 \).

7. Express each of the following statements in conditional form, i.e. in “if-then” form. Also write the negation (without phrases like “it is false that”).
(a) Every odd number is prime.
(b) The sum of the angles of a triangle is 180 degrees.
(c) Passing the test requires solving all the problems.
(d) Being first in line guarantees getting a good seat.
(e) Lockers must be turned in by the last day of class.
(f) I get mad whenever you do that.
(g) I won’t say that unless I mean it.