



# Definition of a Set by Extension and by a Property Satisfied by its Elements

## • Example 1

Write, in extension, the set  $A$  determined by the following equation.

$$A = \{n \in \mathbb{N} \mid 3 \leq 2n + 1 < 8\}$$

$\mathbb{N}$  is the set of natural numbers.

We begin by solving the inequality

$$\begin{aligned} 3 &\leq 2n + 1 < 8 \\ 2 &\leq 2n < 7 \\ 1 &\leq n < \frac{7}{2} \end{aligned}$$

The set of natural numbers that satisfy the above inequality is given by  $\{1, 2, 3\}$ . Thus, we can write  $A$  in extension as

$$A = \{1, 2, 3\}$$

### ● ● ● CHECK YOURSELF 1

Write, in extension, the set  $B$  determined by the following equation.

$$B = \{n \in \mathbb{N} \mid 0 < 5n - 1 \leq 11\}$$

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### ● ● ● CHECK YOURSELF ANSWER

1.  $B = \{1, 2\}$ .

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# 4.1 Exercises

Name \_\_\_\_\_

Section \_\_\_\_\_

Date \_\_\_\_\_

## A N S W E R S

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

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10. \_\_\_\_\_

11. \_\_\_\_\_

12. \_\_\_\_\_

Write, in extension, the sets determined by the following equations.  
 $\mathbb{N}$  represents the set of natural numbers and  $\mathbb{Z}$  represents the set of integers.

1.  $A = \{n \in \mathbb{N} \mid 4 < 3n + 3 \leq 12\}$

2.  $B = \{m \in \mathbb{N} \mid 6 \leq 5m - 9 \leq 10\}$

3.  $D = \{n \in \mathbb{N} \mid 10 \leq n + 4 \leq 13\}$

4.  $C = \{n \in \mathbb{Z} \mid -12 \leq 8n - 3 < 13\}$

5.  $B = \{m \in \mathbb{N} \mid 18 \leq 10m + 6 < 22\}$

6.  $A = \{n \in \mathbb{N} \mid 22 \leq 2n + 9 \leq 25\}$

7.  $D = \{m \in \mathbb{Z} \mid -8 \leq 4 + 2m \leq 13\}$

8.  $C = \{n \in \mathbb{N} \mid 13 \leq -7 + n \leq 23\}$

9.  $B = \{n \in \mathbb{Z} \mid 0 < 8 + 4m \leq 16\}$

10.  $A = \{n \in \mathbb{N} \mid 12 < 13n - 1 < 15\}$

11.  $D = \{m \in \mathbb{N} \mid 3 \leq m - 20 < 5\}$

12.  $B = \{n \in \mathbb{N} \mid 27 \leq 3n - 40 \leq 39\}$