

# Math 099 - Assignment 2

January 22, 2019

Name key

Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations when necessary. This assignment is worth 5 points.

1. Let  $A = \{x | x \in \mathbb{N} \text{ and } x < 12\}$ . Translate into a complete sentence (in words) the equation that defines the set  $A$ .

$A$  IS THE SET OF ALL  $x$  SUCH THAT  $x$  IS A NATURAL NUMBER AND  $x$  IS LESS THAN 12.

2.  $D = \{x | x \in \mathbb{Z} \text{ and } -3 \leq x < 5\}$

(a) Rewrite  $D$  in roster notation.

$$D = \{-3, -2, -1, 0, 1, 2, 3, 4\}$$

(b) Give a verbal description for  $D$ .

$D$  IS THE SET OF INTEGERS BETWEEN  $-3$  AND  $5$ , INCLUDING  $-3$  BUT NOT  $5$ .

3.  $M = \{x | x = 3k + 1 \text{ and } k \in \mathbb{N}\}$

(a) Is 5 an element of  $M$ ? Explain.

No, 5 IS TWO MORE THAN A MULTIPLE OF 3.

(b) Is 10 an element of  $M$ ? Explain.

Yes,  $10 = 3(3) + 1$

(c) Is  $-14$  an element of  $M$ ? Explain.

No,  $-14$  IS 1 MORE THAN A MULTIPLE OF 3, BUT NOT A POSITIVE MULTIPLE.

4. Sometimes, when writing a set in set-builder notation, some of the conditions are included to the left of the "such that" ( $|$ ) symbol. For example,

$$\{x \in \mathbb{N} | x > 10\} \quad \text{and} \quad \{x | x \in \mathbb{N} \text{ and } x > 10\}$$

describe the exact same set. Refer back to the set  $D$  above. Rewrite the set-builder notation for  $D$  using this new idea.

$$D = \{x \in \mathbb{Z} \mid -3 \leq x < 5\}$$

THE ELEMENTS OF  $M$  ARE NUMBERS THAT ARE 1 MORE THAN A POSITIVE MULTIPLE OF 3.