

Math 099 - Assignment 2

August 27, 2018

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.