Algebra 1 Unit 1 worksheet: Writing sets: roster, rule and the empty set

Name _____ Date _____ Period _____

1. Write the set of multiples of 4 that are greater than 11 and less than 50 as a roster with an ellipsis. How many elements does it have?

2. Write each set as a roster and say how many elements it has.

(a) The integers whose square is less than 10.

(b) The whole-number solutions of $2x + 3 = 10$.

(c) The whole numbers that are factors of both 12 and 18.

(d) The integers n whose square is equal to n itself.

3. Hannah puts 65 dollars in a piggy bank and adds 7 dollars at the end of every week, taking nothing out. Let B be the set of the amounts in the piggy bank, in dollars, at the end of weeks 1 to 14.

(a) Write B as a roster with an ellipsis.

(b) Is 93 an element of B?

(c) Is 191 an element of B?

4. Let $S = \{\ldots, -6, -2, 2, 6, \ldots\}$, a list with dots at both ends.

(a) Describe S by a rule in words.

(b) Is S finite or infinite?

(c) Decide whether each of 42, −15 and −22 is an element of S.

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5. Sort these eight descriptions into groups, so that two descriptions are in the same group exactly when they name the same set. Write the set each group names.

(a) The whole numbers n for which $n + 5 = 5$.

(b) The integers strictly between -1 and 1.

(c) The prime numbers that are multiples of 6.

(d) $\{\varnothing\}$

(e) The solutions of $2x = x$.

(f) The integers whose square is -4.

(g) {{ }}

(h) { }

6. Five students each propose a rule in words for the set $\{2, 4, 8, 16, 32\}$. For each rule, decide whether it names exactly this set. If it does not, name one object it gets wrong.

(a) The powers of 2 less than 40.

(b) The even factors of 32.

(c) The even whole numbers from 2 to 32.

(d) The numbers you get by starting at 2 and doubling, for as long as the result is at most 32.

(e) The factors of 64 that are greater than 1 and less than 64.

7. Liam wants to name the set of all numbers greater than 0 and less than 1, and writes $\{0.1, 0.2, 0.3, \ldots, 0.9\}$.

(a) Name a number greater than 0 and less than 1 that is not in Liam's set.

(b) How many elements does Liam's set have?

(c) Explain why no roster with an ellipsis can name the set Liam meant, and describe that set correctly.

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8. Let $A = \{3, 8, 20\}$. Write each set as a complete roster or as a roster with an ellipsis, and say whether it is finite or infinite.

(a) The whole numbers that are less than every element of A.

(b) The whole numbers that are greater than every element of A.

(c) The integers that are less than every element of A.

(d) The whole numbers that are greater than every element of A and also less than every element of A.

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