**Lab for Section 2.1** Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Use good notation and show appropriate work. Write explanations in* ***complete sentences***.

1. State why the description of the set is ***not*** well-defined, then rewrite the description to state a well-defined set.

the set of rich people who own a house in the city of Moorhead

2. Identify whether each set is infinite or finite.

(a) {*x* : *x* is an atom of gold on the planet earth.} (b) the set of rational numbers between –3 and 2

3. Let *A* = {*x* : *x* is a name for a mammal.} and *B* = {2, 5, *m*, *p*, {2}, {2, *m*}}. Replace each blank with either  or .

(a) humpback whale \_\_\_\_\_ *A* (b) great white shark \_\_\_\_\_ *A*

(c) {5} \_\_\_\_\_ *B* (d) *m* \_\_\_\_\_ *B*

4. Use proper set notation to rewrite each set with roster notation.

(a) the set of natural number multiples of five between 2 and 38

(b) {*x* | }

(c) the set of integers which when squared equal 7

5. Use proper set-builder notation to rewrite each set.

(a) {1, 4, 9, 16, 25, 36, 49}

(b) the set of natural number multiples of three

(c) {a, e, i, o, u}

6. Determine the cardinal number, *n*(*A*), for each of the following sets.

(a) *A* = {*x* : *x* is a state in the United States of America.}

(b) *B* = {*x* : *x* is a letter in the English alphabet.}

(c) *C* = {*x* : *x* is a letter in the word *Mississippi*.}

7. Identify which sets are equivalent and which sets are equal. *Hint: First, write each set in roster notation.*

*A* = {*x* : *x* is a letter in *terror*}, *B* = {*x* : *x* is a letter in *totter*}, *C* = {*x* : *x* is a letter in *mirror*},

*D* = {*x* : *x* is a letter in *tear*}, *E* = {*x* : *x* is a letter in *tatter*}, *F* = {*x* : *x* is a letter in *treat*},

*G* = {*x* : *x* is a letter in *rate*}, *H* = {*x* : *x* is a letter in *tare*}, and *I* = {*x* : *x* is a letter in *rote*}

8. (a) Show the sets *A* = {, , , } and *B* = {, , , } are equivalent.

(b) What is the cardinal number for the sets in part (a)?

(c) Use a 1-1 correspondence to illustrate your answer to part (b).

9. (a) Show the sets *C* = {all, ball, call} and *D =* {brunch, crunch, lunch, munch} are not equivalent.

(b) What is the cardinal number for each set in part (a)?

(c) Use a 1-1 correspondence to illustrate each answer to part (b).

10. Write in the simplest possible form {*x* : *x* is a person who was present in today’s class who is either taller than three and one-half meters or shorter than one-fourth meter.}.

11. In the town of Mathville, the barber shaves everyone except those who shave themselves. Consider the collection of people in Mathville that are shaved by the barber. Is the set well-defined?