

You MUST use good notation and show appropriate work.

**Math 102**  
(Section 2.1 & 2.2)

Name \_\_\_\_\_

1. Explain the difference between  $\emptyset$  and  $\{\emptyset\}$ .

2. Express each of the following as a set **both** in set-builder **and** in roster notation.

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

(b) the set of integers which when squared equal 9.

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

3. Express each as a set using set builder notation.

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

(b)  $\{3, 6, 12, 15, \dots\}$

4. Determine the cardinal number,  $n(A)$ , for each of the following sets.

a)  $A = \{x: x \text{ is a letter in our alphabet}\}$

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b)  $A = \{1, 0, \emptyset, \{\emptyset\}\}$

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c)  $A = \{x: x \text{ is a letter in the word "Mississippi"}\}$

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5. Assume  $A$  and  $B$  are two nonempty sets. Explain each of the following in your own words.

(a)  $A$  equals  $B$ .

(b)  $A$  is equivalent to  $B$ .

6. Assume  $A$  is a set and that  $n(A) = 6$ .

(a) Determine the number of distinct subsets of  $A$ .

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(b) Determine the number of distinct proper subsets of  $A$ .

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(c) Using Pascal's Triangle (without proof - see page 41), how many different subsets of size 3 can be formed choosing elements from  $A$ ?

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7. Classify each by writing "*true*" or "*false*" in the blank provided.

(a)  $\{a, b, c\} = \{b, c, a\}$

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(b)  $n(\{a, b, c\}) = n(\{1, 2, 3\})$

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(c)  $\{b\} \in \{a, b\}$

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(d)  $\{0, 1\} \subset \{0, \{0, 1\}, 2\}$  (be careful)

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(e)  $\{\{0, 1\}\} \subseteq \{0, \{0, 1\}, 2\}$

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(f)  $\{2, 4, 6\}$  and  $\{4, 6, 8\}$  are equivalent sets.

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(g)  $\{\emptyset\}$  and  $\{0\}$  are equivalent sets.

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