**Math 231 – HW 8 Name: Troy Jeffery**

Epp 2nd Ed. 5.1 1, 2, 3, 5, 6, 7, 10, 15

5.2 25a, b

5.3 1, 4 (explain why rather than give a formal proof), 6.

**5.1 (1)** Which of these sets are equal?

|  |  |
| --- | --- |
| (a) {a,b,c,d}  (c) {d,b,a,c} | (b) {d,e,a,c}  (d) {a,a,d,e,c,e} |

**5.1 (2)** Is 4 = {4}? Explain!

The number the set containing 4.

**5.1 (3)** Graph each set on a number line.

A={0,1,2}



B={x∈|-1≤x<3}



C={x∈|-1<x<3}



D={x∈|-1<x<3}



E={x∈|-1<x<3}



Which of these sets were equal?

The only two that are equal are A and D.

**5.1 (5)** Let A={c,d,f,g}, B={f,j}, and C={d,g}. Answer each of the following questions.

(a) Is B ⊆ A? Explain.

*No, f and j are not contained in the set A.*

(b) Is C ⊆ A? Explain.

*Yes, d and g are contained in the set A.*

(c) Is C ⊆ C? Explain.

*Yes, every element of C is contained in the set C.*

(d) Is C a proper subset of A? Explain.

*Yes, C is a subset of A and there are additional elements of C not in A.*

**5.1 (6)** Yes or no? Be ready to discuss your answers.

|  |  |  |  |
| --- | --- | --- | --- |
| (a) Is 3∈{1,2,3}? | Yes | (f) Is {2}⊆{1,{2},{3}}? | No, the number 2 is not contained in the set. |
| (b) Is 1⊆{1}? | No, The number 1 is not the same as the set of 1. | (g) Is {1}⊆{1,2}? | Yes |
| (c) Is {2}∈{1,2}? | No, the set containing 2 is not contained in the set containing 1 and 2. | (h) Is 1∈{{1},2}? | No, the number 1 is not contained in the set. |
| (d) Is {3}∈{1,{2},{3}}? | Yes | (i) Is {1}⊆{1,{2}}? | Yes |
| (e) Is 1∈{1}? | Yes | (j) Is {1}⊆{1}? | Yes |

**5.1 (7)** Let A={b,c,d,f,g} and B={a,b,c}. Find each of the following:

|  |  |
| --- | --- |
| (a) A∪B | {a,b,c,d,f,g} |
| (b) A∩B | {b,c} |
| (c) A-B | {d,f,g} |
| (d) B-A | {a} |

**5.1 (10)** True or False? Be ready to discuss your answers.

|  |  |  |  |
| --- | --- | --- | --- |
| (a) ? | True | (e) ? | True |
| (b) ? | False, all real negative numbers are not completely contained in the set of rational numbers. | (f) ? | True |
| (c) ? | False, the set of rational numbers is not completely contained in the set of integers. | (g) ? | True |
| (d) ? | False, zero is missing. | (h) ? | False, it would only be equal to |

**5.1 (15)** Neatly shade the region corresponding to each set.

(a) A∩B (b) B∪C

**A**

**B**

**C**

**U**

**A**

**B**

**C**

**U**

(c) AC (d) A-(B∪C)

**A**

**B**

**C**

**U**

**A**

**B**

**C**

**U**

(e) (A∪B)C (f) AC∩BC

**A**

**B**

**C**

**U**

**A**

**B**

**C**

**U**

**5.2 (25a)** Illustrate one of the distributive laws by shading in the region corresponding to A∪(B∩C) on one copy of the diagram and (A∪B)∩(A∪C) on the other. Label them!

**A**

**B**

**C**

**U**

**A**

**B**

**C**

**U**

**5.2 (25b)**

Illustrate the other distributive law by shading in the region corresponding to A∩(B∪C) on one copy of the diagram and (A∩B) ∪ (A∩C) on the other. Label them!

**A**

**B**

**C**

**U**

**A**

**B**

**C**

**U**

**5.3 (1)**

(a) Is the number 0 in ∅? Explain.

*A number cannot be contained in an empty set.*

(b) Is ∅={∅}? Explain.

*No, an empty set is not the same as a set containing an empty set.*

(c) Is ∅∈{∅}? Explain.

*Yes, an empty set is contained in the set containing an empty set.*

**5.3 (4)** Show that (explain informally) that for all subsets A of a universal set U, A∩AC=∅, and A∪AC=U.

1. *A and A’s compliment is requesting the intersection of A and(exclusive) everything that is not A which is obviously nothing.*
2. *A (and/or) A’s compliment is the same as saying all of A and(inclusive) everything outside of A.*

**5.3 (6)** Draw Venn diagrams to describe the sets A, B, and C that satisfy the given conditions:

(a) A∩B=∅, A⊆C, C∩B≠∅.

(b) A⊆B, C⊆B, A∩C≠∅.

(c) A∩B≠∅, B∩C≠∅, A∩C=∅.