EXTRA PRACTICE - Exercises

Unit I – The Structure of Mathematics
Part E – Mathematical Model
Lesson 1 – The Mathematics of Sets

For each of the following, write the roster for each set given as a rule, and write the rule for each set given as a roster.

1. {Superior, Michigan, Huron, Erie, Ontario}

2. The set of states in the United States that have no common border with any other state.

3. The set of multiples of 5 between 0 and 50.

4. {W, X, Y, Z}

Using the given sets, find the union or intersection as indicated in each of the following.

G = {a, 1, o, t, 6, 9, 14} H = {1, 2, 3, 4} I = {3, 6, 11} J = {2, 1, s, a, 9} K = {6, 11, t}

5. $I \cup K$ 6. $H \cap G$ 7. $K \cap I$ 8. $G \cup J$

9. $J \cap H$ 10. $G \cup H$ 11. $K \cap H$ 12. $I \cap H$

13. $I \cap J$ 14. $G \cap J$ 15. $I \cap K \cup H$ 16. $H \cup I \cup K$

EXTRA PRACTICE - Exercises

Unit I – The Structure of Mathematics
Part E – Mathematical Model
Lesson 1 – The Mathematics of Sets (continued)

Use a Venn Diagram to illustrate the relationships in the following survey of students. Then answer the questions.

The results of a survey of 85 students shopping for school supplies at a local shop-smart store showed the following preferences in writing instruments.

26 liked wooden lead pencils
29 liked mechanical pencils
38 liked ballpoint pens
7   liked wooden lead pencils and mechanical pencils
9   liked mechanical pencils and ballpoint pens
14 liked wooden lead pencils and ballpoint pens
5   liked all three

Determine the number of students who liked:

17. None of the three writing instruments.

18. Wooden lead pencils only.

19. Mechanical pencils and ballpoint pens but did not like wooden lead pencils.

20. Ballpoint pens only.

21. Mechanical pencils or ballpoint pens.

22. Only two of the three writing instruments.

Unit I – The Structure of Mathematics
Part E – Mathematical Model
Lesson 1 – The Mathematics of Sets

For each of the following, write the roster for each set given as a rule, and write the rule for each set given as a roster.

1. {Superior, Michigan, Huron, Erie, Ontario}

{Five lakes comprising the great lakes}

2. The set of states in the United States that have no common border with any other state.

{Alaska, Hawaii}

3. The set of multiples of 5 between 0 and 50.

{5, 10, 15, 20, 25, 30, 35, 40, 45}

4. {W, X, Y, Z}

{The last 4 letters of the alphabet}

Using the given sets, find the union or intersection as indicated in each of the following.

$\mathbf{G} = \{a, 1, o, t, 6, 9, 14\}$ $\mathbf{H} = \{1, 2, 3, 4\}$ $\mathbf{I} = \{3, 6, 11\}$ $\mathbf{J} = \{2, 1, s, a, 9\}$ $\mathbf{K} = \{6, 11, t\}$

5. $\mathbf{I} \cup \mathbf{K}$	6. $\mathbf{H} \cap \mathbf{G}$	7. $\mathbf{K} \cap \mathbf{I}$	8. $\mathbf{G} \cup \mathbf{J}$
{3, 6, 11, t}	{1}	{6, 11}	{0, 1, 2, 6, 9, 14, a, s, t}

9. $\mathbf{J} \cap \mathbf{H}$	10. $\mathbf{G} \cup \mathbf{H}$	11. $\mathbf{K} \cap \mathbf{H}$	12. $\mathbf{I} \cap \mathbf{H}$
{1, 2}	{0, 1, 2, 3, 4, 6, 9, 14, a, t}	{ } or ∅	{3}

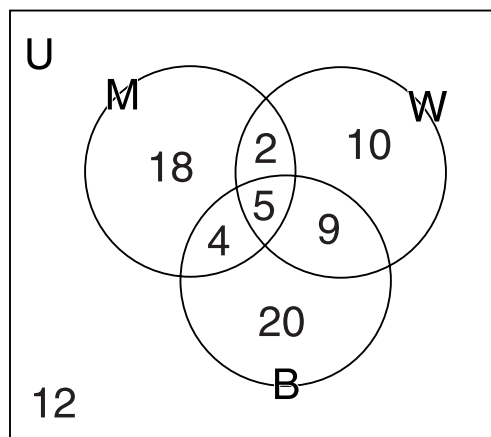| 13. $\mathbf{I} \cap \mathbf{J}$	14. $\mathbf{G} \cap \mathbf{J}$	15. $\mathbf{I} \cap \mathbf{K} \cup \mathbf{H}$	16. $\mathbf{H} \cup \mathbf{I} \cup \mathbf{K}$
{ } or 0	{1, a}	{1, 2, 3, 4, 6, 11}	{1, 2, 3, 4, 6, 11, t}

Unit I – The Structure of Mathematics
Part E – Mathematical Model
Lesson 1 – The Mathematics of Sets (continued)

Use a Venn Diagram to illustrate the relationships in the following survey of students. Then answer the questions.

The results of a survey of 85 students shopping for school supplies at a local shop-smart store showed the following preferences in writing instruments.

    26 liked wooden lead pencils
    29 liked mechanical pencils
    38 liked ballpoint pens
    7   liked wooden lead pencils and mechanical pencils
    9   liked mechanical pencils and ballpoint pens
    14 liked wooden lead pencils and ballpoint pens
    5   liked all three

Determine the number of students who liked:

17. None of the three writing instruments. 17

18. Wooden lead pencils only. 10

19. Mechanical pencils and ballpoint pens but did not like wooden lead pencils. 4

20. Ballpoint pens only. 20

21. Mechanical pencils or ballpoint pens. 42

22. Only two of the three writing instruments. 15