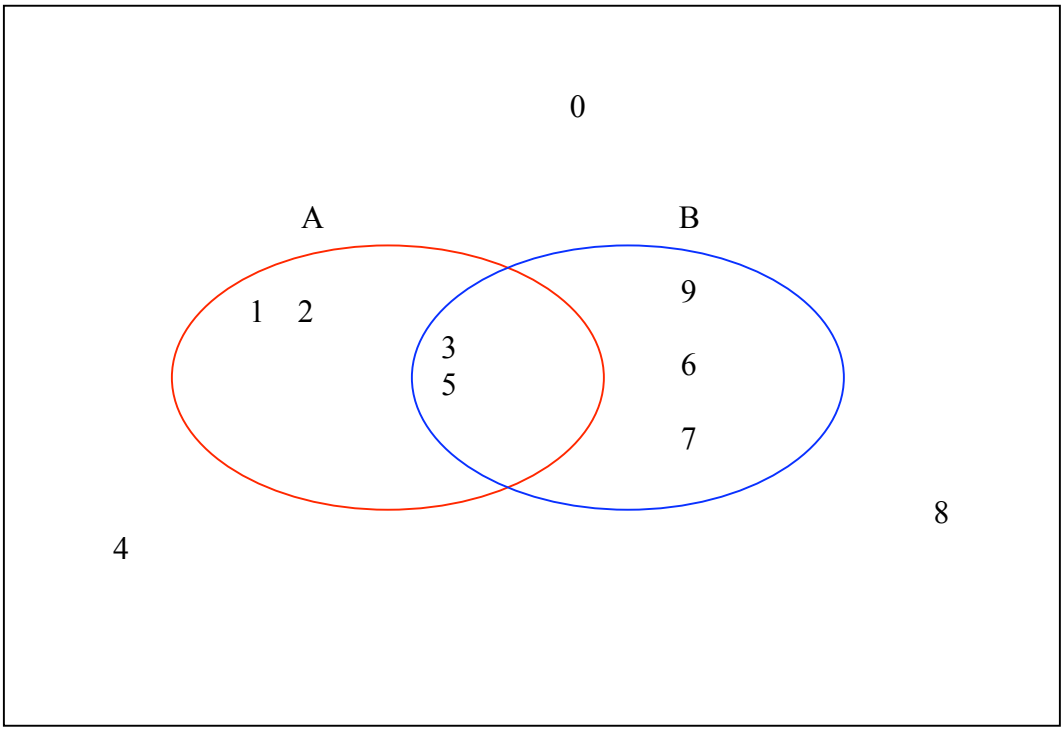
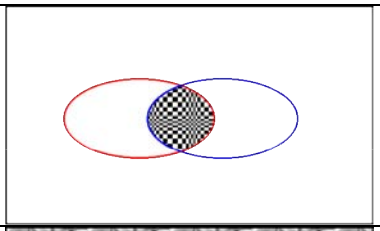
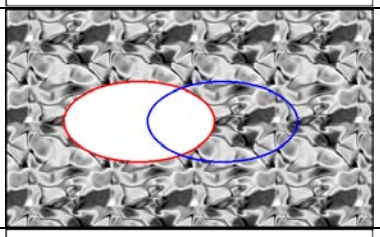
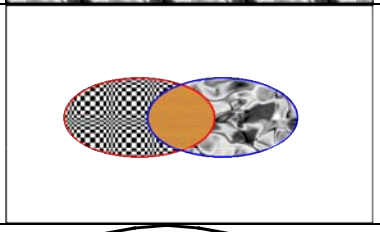
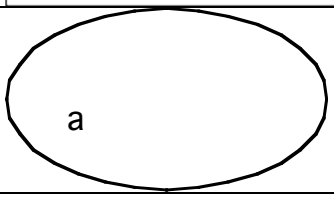
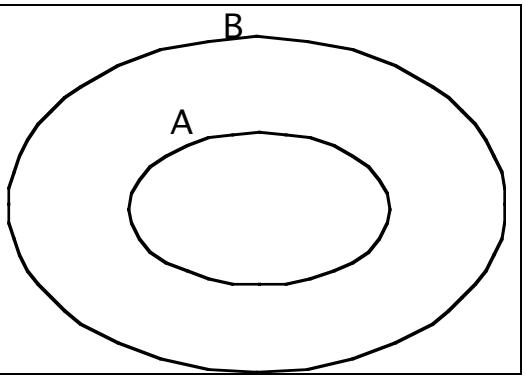
Putting the two Together

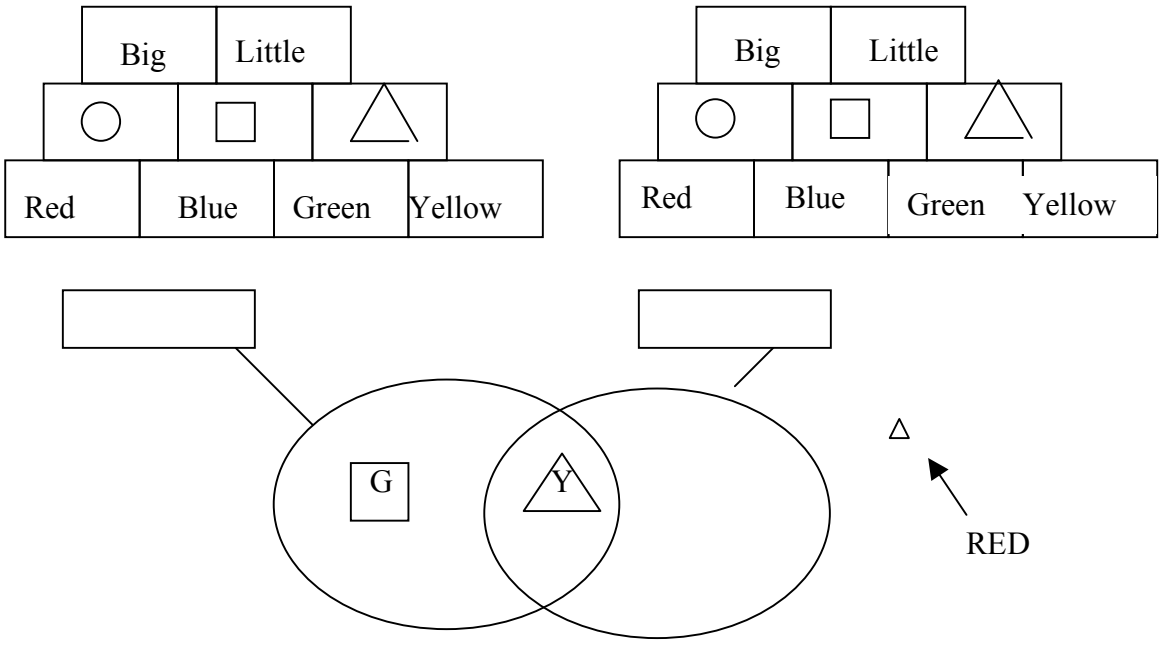


Mathematics	English	
Intersection $A \cap B$	Inside A and B	
Complement $\overline{A}$	Not in A	
Union $\cup$	In A OR in B	
Is an element of $a \in A$	Is inside A	

Subset $A \subseteq B$	Set A is Contained it set B. Show Possibilities for A,B Using 0,1,2,3	

How are we Doing?.

1. Label Strings



Draw the venn diagram (strings) and shade the following region for each set below:

1. $A \cap B$

2. A - B

3. $A \cup B$

4. $\overline{A}$

5. $\overline{A \cap B}$

6. $\overline{A} \cup B$

7. $\overline{A} \cap B$

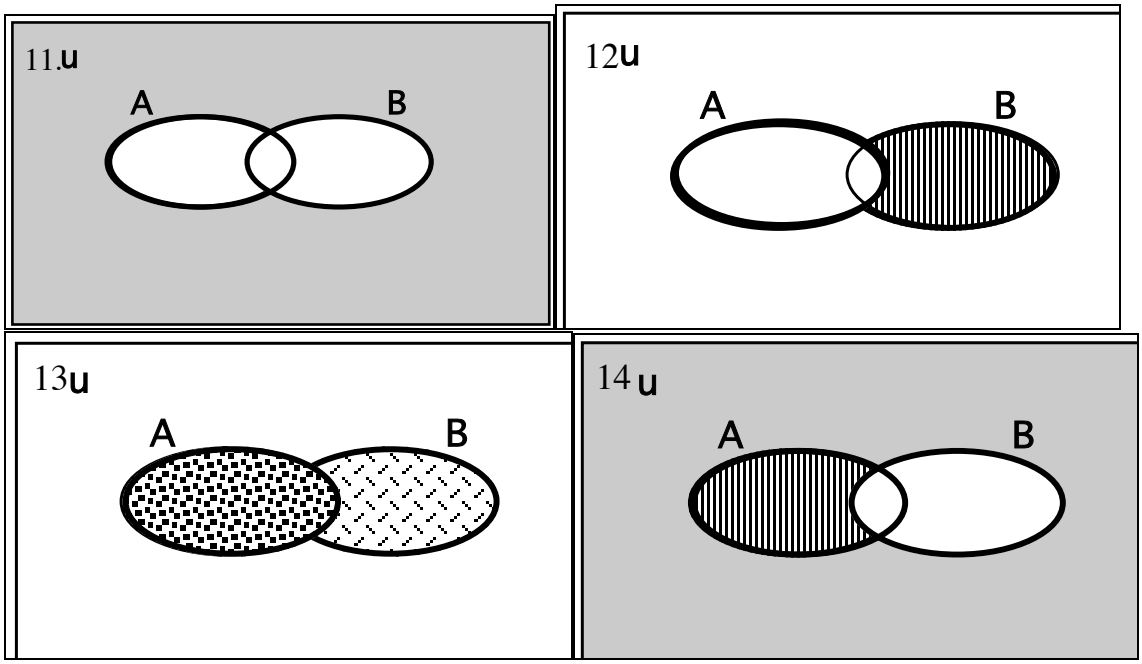
8. Which are equivalent?

9-10 use A= {a,b,c }

9. List the possibilities for B where B⊆ A

10. B ⊂ A

11. DESCRIBE THE SET ILLUSTRATED BELOW.



15- 10. U = { 1,2,3,4,5,6,7,8,9,0 }

A= { 1,3,5,7,9 } B= { 3,4,5,6,7 } C = { 2,4,6,8 }

15. A ∩ (B ∪ C)

TRUE OR FALSE

19. a ∈ { a,b,c}

20. {a} ∈ { a, b , c }

21. {a,b,c } ⊂ { a.b.c }

22. $\varnothing \not\subset$ {a,b,c}

Convert the following to base ten

24. 121011_{three}

25. 456_{eight}

26. 131_{nine}

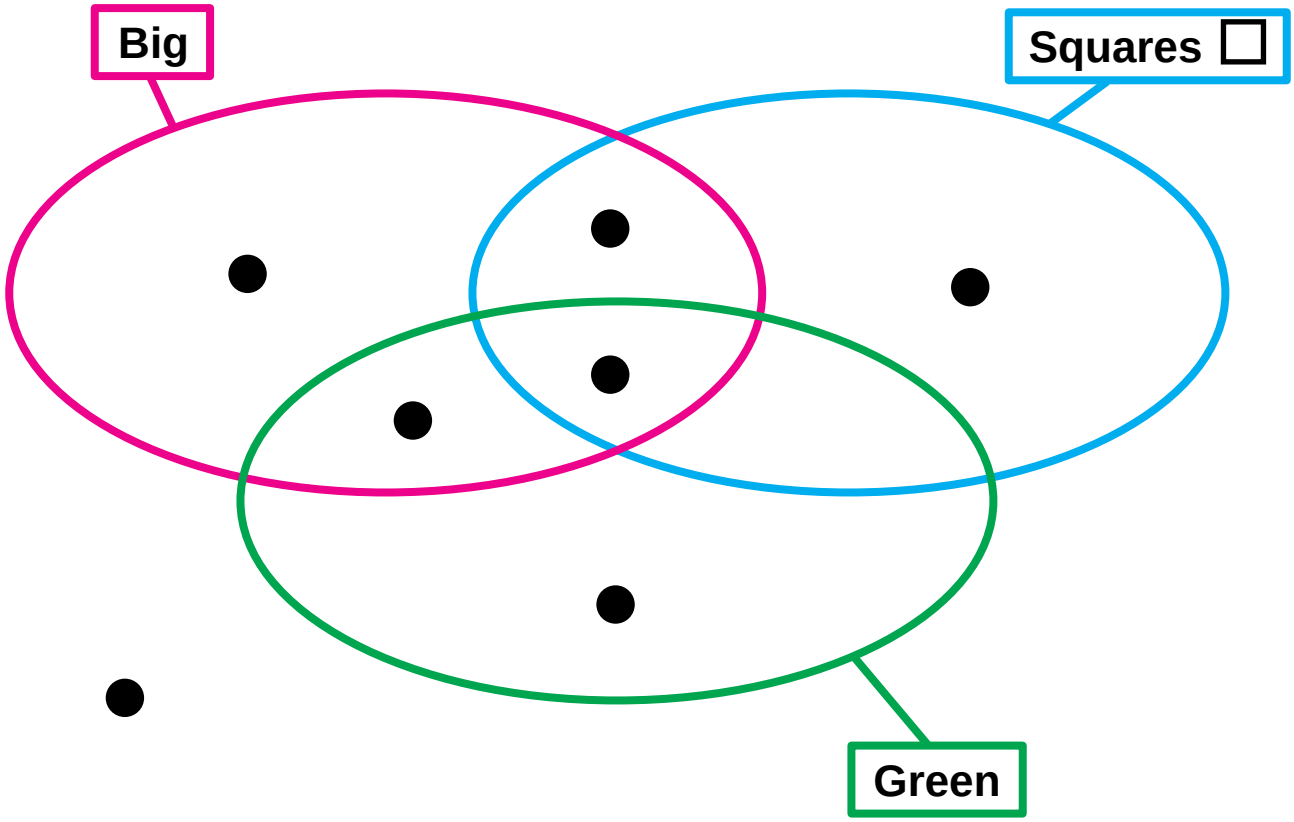
Name _____ Team _____			Name _____ Team _____	
Red String	**Blue String**		**Red String**	**Blue String**
RED	RED		RED	RED
YELLOW	YELLOW		YELLOW	YELLOW
GREEN	GREEN		GREEN	GREEN
BLUE	BLUE		BLUE	BLUE
				
				
				
BIG	BIG		BIG	BIG
LITTLE	LITTLE		LITTLE	LITTLE
NOT RED	NOT RED		NOT RED	NOT RED
NOT YELLOW	NOT YELLOW		NOT YELLOW	NOT YELLOW
NOT GREEN	NOT GREEN		NOT GREEN	NOT GREEN
NOT BLUE	NOT BLUE		NOT BLUE	NOT BLUE
NOT 	NOT 		NOT 	NOT 
NOT 	NOT 		NOT 	NOT 
NOT 	NOT 		NOT 	NOT 

Name _____ Team _____			Name _____ Team _____	
Red String	**Blue String**		**Red String**	**Blue String**
RED	RED		RED	RED
YELLOW	YELLOW		YELLOW	YELLOW
GREEN	GREEN		GREEN	GREEN
BLUE	BLUE		BLUE	BLUE
				
				
				
BIG	BIG		BIG	BIG
LITTLE	LITTLE		LITTLE	LITTLE
NOT RED	NOT RED		NOT RED	NOT RED
NOT YELLOW	NOT YELLOW		NOT YELLOW	NOT YELLOW
NOT GREEN	NOT GREEN		NOT GREEN	NOT GREEN
NOT BLUE	NOT BLUE		NOT BLUE	NOT BLUE
NOT 	NOT 		NOT 	NOT 
NOT 	NOT 		NOT 	NOT 
NOT 	NOT 		NOT 	NOT 

Name _____

L9 **

Match the A-blocks with dots in the strings.



Describe a piece to put in the place with no dot. _____

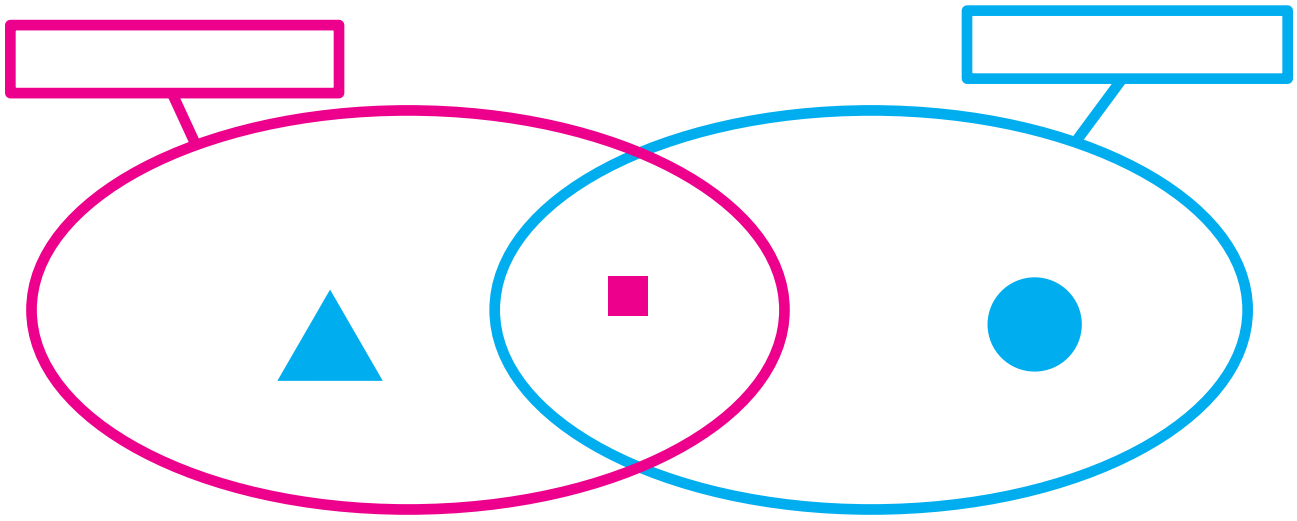
The red string is for one of these:

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

The blue string is for one of these:

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

Label the strings.



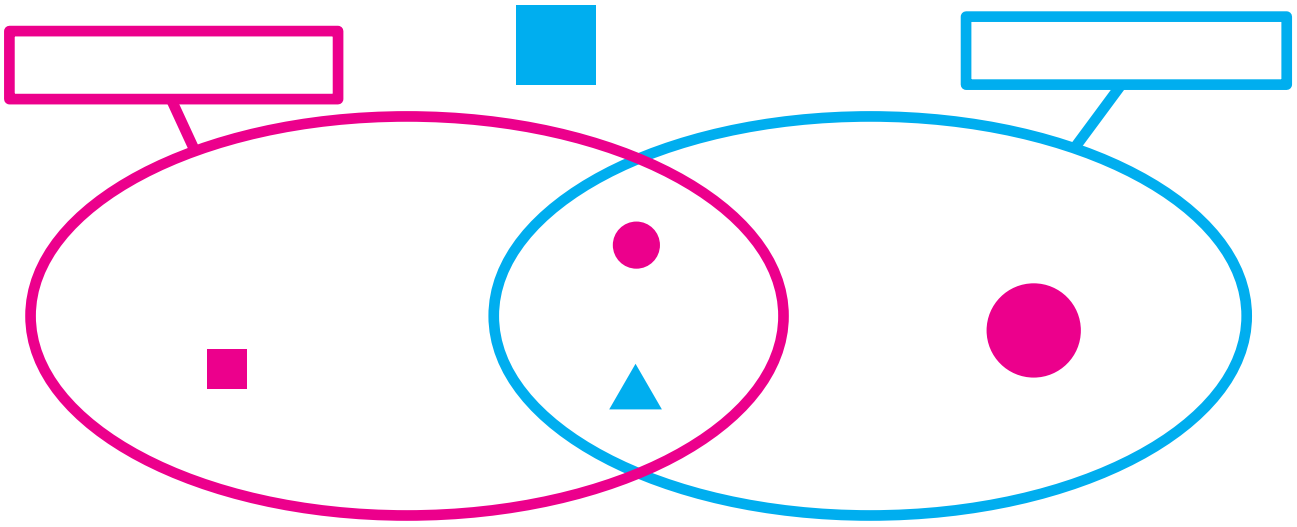
The red string is for one of these:

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

The blue string is for one of these:

RED	YELLOW	GREEN	BLUE
NOT RED	NOT YELLOW	NOT GREEN	NOT BLUE
○	△	□	BIG
NOT ○	NOT △	NOT □	LITTLE

Label the strings.



c. The set of prime numbers less than 100.

d. The set of fractions between 0 and 1.

e. The set of students in your class.

4. Which of the sets in Exercise 3 are not well defined? Redefine those sets so that they are well defined.

5. Let U be the set of all colors and S be the subset {red, orange, yellow, green, blue, violet}.

For the following questions, place the appropriate symbol in the blank: $\subset, \not\subset, \in, \notin$

a. S __ U

b. red __ U

c. {magenta} __ U

d. {green, blue} __ S

Which of the following are true? Briefly explain your answer.

e. $S \subseteq U$

f. red $\subseteq U$

g. gray $\in S$

h. {green, blue} $\subseteq S$

6. Fill in the most appropriate symbol for each of the following: $\subset, \not\subset, \in, \notin$. *Briefly* justify your choice.

a. 3 __ {1, 2, 3}

b. {3} __ {1, 2, 3}

c. {1} __ {{1}, {2}, {3}}

d. {a} __ {a, b, c}

e. {ab} __ {a, b, c, d}

f. { } __ {1, 2, 3}

7. a. How many subsets does $A = \{p, i, c, k, l, e\}$ have?

b. Can you make a generalization about the relationship between the number of elements in a set and the number of subsets? *Hint:* Look at Investigation 2.3.

8. Can you apply what you learned in Investigation 2.3 to answer the following question? There are 6 members on the Student Council. A committee consisting of 2 members is to be made. How many different committees are possible?

9. Justify the following statements, as though you were talking to a student who had not read this section.

a. Every set is a subset of itself.

b. The empty set is a subset of every set.

10. Make a Venn diagram with four circles. Use a compass or another device to make good circles. How many distinct regions are there in this diagram? What patterns do you notice in this diagram?

11. Find a Venn diagram from a newspaper, magazine, or elementary school mathematics book. Describe the Venn diagram in words.

12. Let $U = \{x \mid x \text{ is an American}\}$

$F = \{x \mid x \text{ is a female}\}$

$S = \{x \mid x \text{ is a smoker}\}$

$P = \{x \mid x \text{ has a health problem}\}$

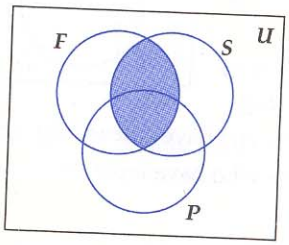
a. Represent the following description with a Venn diagram and with symbols: An American nonsmoking healthy female.

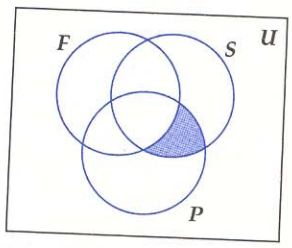
b. Represent $F \cap (S \cup P)$ with a Venn diagram and in everyday English.

c. Represent $(F \cup P) \cap \overline{S}$ with a Venn diagram and in everyday English.

d. Convert the information from the left-hand diagram to everyday English and to symbols.

e. Convert the information from the right-hand diagram to everyday English and to symbols.





13. In the following Venn diagram,

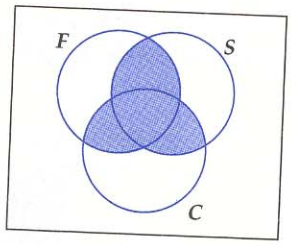
F = the set of students in the film club

S = the set of students in the science club

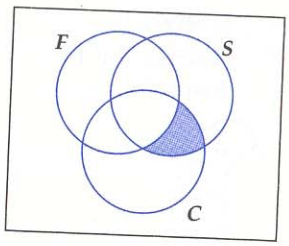
C = the set of students in the computer club

Describe the following sets in English and in symbols.

a.



b.



c. Describe the following subsets in symbolic language and with a Venn diagram.

d. Those people who are in the science and film clubs but not the computer club

e. Those people who are in none of the three clubs

14. Use the sets below to answer parts (a) through (f):

$U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

A: the numbers in U that divide 12 with no remainder

B: the numbers in U that divide 15 with no remainder

C: the numbers in U that divide 20 with no remainder

a. Make a *clear* Venn diagram showing the sets U, A, B, and C.

b. Represent the following subset with symbols: {7, 8, 9, 11, 13, 14, 16, 17, 18, 19}.

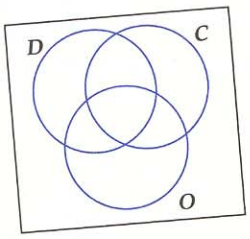
c. Represent the following subset in everyday English and with symbols: {2, 4}.

d. Represent the following subset in everyday English and with a diagram: $\overline{A \cap B}$.

e. Represent the following subset in everyday English and with a diagram: $\overline{A \cup B}$.

f. Represent the following subset with a diagram and with symbols: Those numbers that divide 12 or 15 with no remainder.

15. An elementary teacher has asked her students to place their names in the region that represents their answers to the question "Which pets live in your home?"



D = the set of students who have at least one dog

C = the set of students who have at least one cat

O = the set of students who have a pet that is not a dog or a cat

Describe the following sets in everyday English and then with a diagram:

a. $C \cap D$ b. $\overline{D \cup C}$ c. $C \cap O \cap D$

Describe the following sets in symbols and then with a diagram:

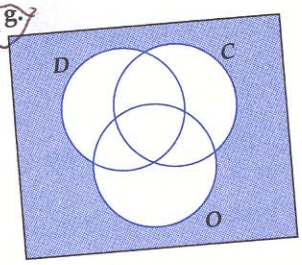
d. Students who have dogs but not cats

e. Students who have at least one pet

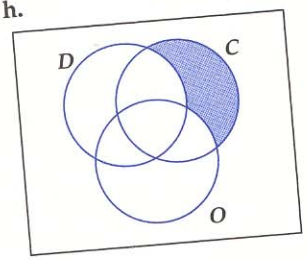
f. Students who have other pets but neither cats nor dogs

Describe the following sets in everyday English and then with symbols:

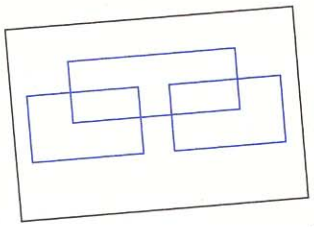
g.



h.



16. Why do you think we use circles instead of squares or triangles or other shapes when we make Venn diagrams? For example, is the representation below equivalent to the standard Venn diagram with three overlapping circles? Explain your answer as though you were talking to a fellow student who does not understand.



17. Recall the different kinds of sets of numbers described earlier: natural numbers, whole numbers, integers, and rational numbers. Make a Venn diagram to represent how these sets are related.

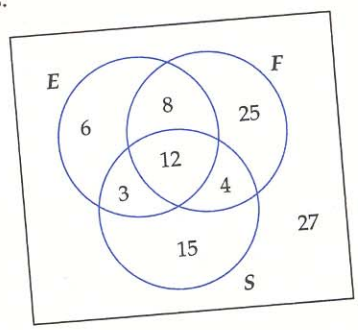
18. Pollsters often ask people's opinions. Politicians want to know how their position on an issue is viewed by particular constituencies—for example, by young voters, by African Americans, by women, by those who belong to the Sierra Club. Decisions about policies are often made on the basis of this polling information. Let's say that a public opinion survey was conducted to determine how much support there was for the president's policies. People were asked three questions:

Do you support the president's economic policy?

Do you support the president's foreign policy?

Do you support the president's social policy?

Let E, F, and S denote the sets of persons responding yes to the first, second, and third questions, respectively. The results of the survey are shown in the Venn diagram below. The numbers represent the percent of respondents.



a. What percent agree with his economic policy?

b. What percent agree with just one of his policies?

c. Describe the subset that would be represented by $F \cup (E \cap S)$, either in everyday English or by shading the appropriate portion of the diagram.

d. If the president could make one single region of the Venn diagram larger (that is, make it have more members), which would it be? Why?

19. In a group of 120 students, 75 know how to use a Macintosh, 65 know how to use an IBM-compatible computer, and 20 do not know how to use either kind.

a. How many students know how to use both kinds of computers?

b. Are the sets in this problem well defined or not? Justify your response.

20. An advertising firm found that a certain ad that ran on both radio and TV was only heard on the radio by 21 percent of the people and was only seen on TV by 33 percent of the people. Just 10 percent of the population both heard the ad on the radio and saw it on TV.

a. What percent of the people in the area has neither seen nor heard the ad?

b. What percent of the people in the area only heard the ad on radio or only saw the ad on TV?