1. A class of 40 students completed a survey on pets they like. The choices were dogs, cats and birds.

Everyone liked at least one pet.

10 students liked cats and birds but not dogs.

2 students liked birds and dogs but not cats.

12 students liked cats and birds.

8 students liked cats and dogs.

All together, 28 liked cats, 19 liked dogs and 15 liked birds.

Represent this information on a Venn diagram.

2. Suppose I discovered that my cat had a taste for the adorable little geckoes that live in the bushes and vines in my yard, back when I lived in Arizona. In one month, suppose he deposited the following on my carpet: six grey geckoes, twelve geckoes that had dropped their tails in an effort to escape capture, and fifteen geckoes that he'd chewed on a little. Only one of the geckoes was grey, chewed on, and tailless; two were grey and tailless but not chewed on; two were grey and chewed on but not tailless. If there were a total of 24 geckoes left on my carpet that month, and all of the geckoes were at least one of "grey", "tailless", and "chewed on", how many were tailless and chewed on but not grey?

3. 100 students were interviewed  
28 took PE, 31 took BIO, 42 took ENG, 9 took PE and BIO, 10 took PE and ENG, 6 took BIO and ENG, 4 took all three subjects.  
a) How many students took none of the three subjects?   
b) How many students took PE but not BIO or ENG?   
c) How many students took BIO and PE but not ENG?

4. A group of 62 students were surveyed, and it was found that each of the students surveyed liked at least one of the following three fruits: apricots, bananas, and cantaloupes.  
  
34 liked apricots.  
30 liked bananas.  
33 liked cantaloupes.  
11 liked apricots and bananas.  
15 liked bananas and cantaloupes.  
17 liked apricots and cantaloupes.  
19 liked exactly two of the following fruits: apricots, bananas, and cantaloupes  
  
a. How many students liked apricots, but not bananas or cantaloupes?  
b. How many students liked cantaloupes, but not bananas or apricots?  
c. How many students liked all of the following three fruits: apricots, bananas, and cantaloupes?  
d. How many students liked apricots and cantaloupes, but not bananas?

5. 90 students went to a school carnival. 3 had a hamburger, soft drink and ice-cream. 24 had hamburgers. 5 had a hamburger and a soft drink. 33 had soft drinks. 10 had a soft drink and ice-cream. 38 had ice-cream. 8 had a hamburger and ice-cream. How many had nothing?

6. 200 students are surveyed. 80 take Math, 60 take History, 140 take English, 40 take Math and History, 30 take History and English, and 20 take Math and English. How many students take all 3 classes? What assumption do you have to make in order to answer this question?

**7. Superburger sells hamburgers with the choice of ketchup, mustard and relish. One day they sold 256 hamburgers; 140 had mustard, 140 had ketchup, 84 had ketchup and relish, 62 had mustard but no relish, 68 had ketchup and mustard, 38 had all three condiments and 20 had none.**

**(a) The number sold with relish only is?**

**(b) The number sold with no relish is?**

8. Twenty-four dogs are in a kennel.  Twelve of the dogs are black, six of the dogs have short tails, and fifteen of the dogs have long hair.  There is only one dog that is black with a short tail and long hair.  Two of the dogs are black with short tails and do not have long hair.  Two of the dogs have short tails and long hair but are not black.  If all of the dogs in the kennel have at least one of the mentioned characteristics, how many dogs are black with long hair but do not have short tails?

9. There are 150 students at Seward High School. 66 students play baseball, 45 play basketball, and 42 play soccer. 27 students play exactly two sports, and three students play all three of the sports. How many of the 150 students play none of the three sports?

10. Hypothetically, there are 178 grade 12 students at FLC High School, 92 have enrolled in Data Management, 71 have enrolled in Advanced Functions, and 40 have enrolled in Calculus. The math students include 14 who are taking both Data Management and Advanced Functions, 18 are taking Data Management and Calculus, 11 are taking Advanced Functions and Calculus. Lastly there are 8 brave souls taking all three maths.  
How many grade 12 students at FLC High school not enrolled in any math class?

11. A certain school has three performing arts extracurricular activities: Band, Chorus, or Drama.  Students must participate in at least one, and may participate in two or even in all three.  There are 120 students in the school.  There are 70 students in Band, 73 in the Chorus, and 45 in the Drama.  Furthermore, 37 students are in both the Band and Chorus, 20 are in both the Band and the Drama, and 8 students are in all three groups.  Twenty-five students are just in the chorus, not in anything else.   How many students participate in only the drama?

12. At Dawnview High there are 400 Grade 11 learners. 270 do Computer Science, 300 do English and 50 do Business studies. All those doing Computer Science do English, 20 take Computer Science and Business studies and 35 take English and Business studies. Using a Venn diagram, calculate the probability that a pupil drawn at random will take:

1. English, but not Business studies or Computer Science
2. English but not Business studies
3. English or Business studies but not Computer Science
4. English or Business studies

13. There are 79 Grade 10 learners at school. All of these take some combination of Maths, Geography and History. The number who take Geography is 41; those who take History is 36; and 30 take Maths. The number who take Maths and History is 16; the number who take Geography and History is 6, and there are 8 who take Maths only and 16 who take History only.

1. Draw a Venn diagram to illustrate all this information.
2. How many learners take Maths and Geography but not History?
3. How many learners take Geography only?
4. How many learners take all three subjects?