Section 3.7: Arguments and **Euler** Diagrams

(Objective 1)

**Leonard Euler** (1707-1783): Swiss mathematician; 13 children; head of St. Petersburg Academy in Russia at age 26; wrote more than 500 books and papers published in Latin, French, German; blind last 17 years of his life; the most successful notation builder of all times.

Euler used circles to represent sets in syllogistic arguments (arguments whose premises are quantified statements). Use Euler diagrams to determine the validity of syllogisms.

- **All S are P.**
- **No S are P.**
- **Some S are P.**
- **Some S are not P.**

**All A's are B's.**

```
  B
 /\
/   \
A    
```

**No A's are B's.**

```

```

**Some A's are B's.**

```

```

**Some A's are not B's.**

```

```

The exists at least one.
When testing the validity of an argument, try to show the argument is invalid by finding a case where the conclusion does not necessarily follow from the premises. If you cannot find such a "no" case or counterexample, then the argument is valid.

Use Euler diagrams to determine the validity of the argument:

All whales are mammals. 
Moby is a whale. 
∴ Moby is a mammal.

All whales are mammals. 
You are a mammal. 
∴ You are a whale.
All whales are mammals.
Mabel is not a whale.
∴ Mabel is not a mammal.

All donuts are sweet.
All sweet things are fattening.
∴ All donuts are fattening.
All textbooks are expensive.
All jewels are expensive.
∴ All textbooks are jewels.

All humans are warm-blooded.
No reptiles are warm-blooded.
∴ No reptiles are human.

HERE'S WHERE CLASS ENDED 11.03.2009 // PLEASE READ ON TO FINISH THIS SHEET.
All humans are warm-blooded. ✓
No reptiles are human. ✓
∴ No reptiles are warm-blooded.

No 5-year old can drive. ✓
Bryan cannot drive. ✓
∴ Bryan is 5 years old. ✓
Some pets are cats. ✔
Some cats are strays. ✔
∴ Some pets are strays. ✗

All logic problems make sense. ✔
Some jokes make sense. ✔
∴ Some logic problems are jokes. ✗

INVALID

READ THESE ITEMS!
See text ex. 1 - 6 and use Logic Applications Handout.