

Section 1.4: Negation of Quantifiers and Venn Diagrams

Examples: Negate each quantifier.

All dogs are friendly.

Negation: **SOME DOGS ARE NOT FRIENDLY.**

Some students were late:

Negation: **NO STUDENTS WERE LATE.**

No computers were on sale:

Negation: **SOME COMPUTERS WERE ON SALE.**

Some monkeys are not smart.

Negation: **ALL MONKEYS ARE SMART.**

All teachers are rich.

Negation: **SOME TEACHERS ARE NOT RICH.**

Some mammals do not have tails:

Negation: **ALL MAMMALS DO HAVE TAILS.**

No celebrity is happy.

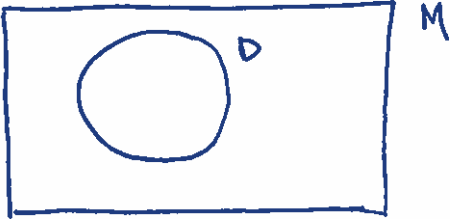
Negation: **SOME CELEBRITIES ARE HAPPY.**

Venn Diagrams for Quantifiers

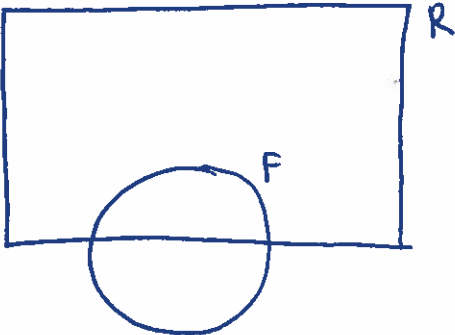
A Venn diagram is a picture that shows relationships between quantifiers and their properties to prove arguments valid or invalid.

Examples: Draw a Venn diagram for each.

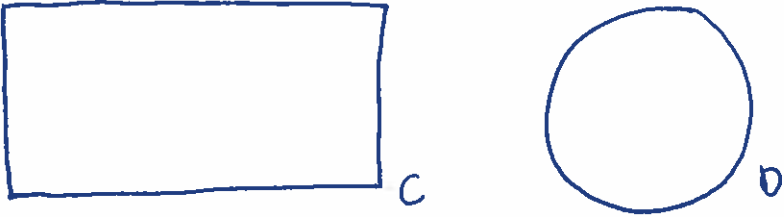
All dogs are mammals.



Some five-year-olds can read.



No dogs are cats.

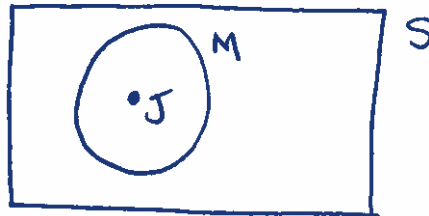


Venn Diagrams for valid arguments

Examples: Prove using a Venn diagram if the argument is valid or invalid.

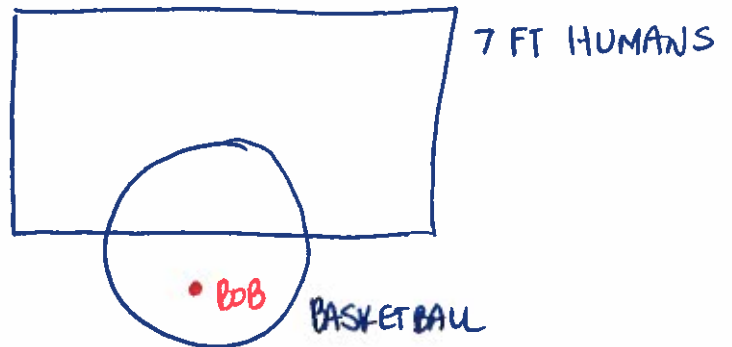
- ✓ All math majors are smart.
- ✓ John in a math major.
- ✓ Therefore, John is smart.

VALID!



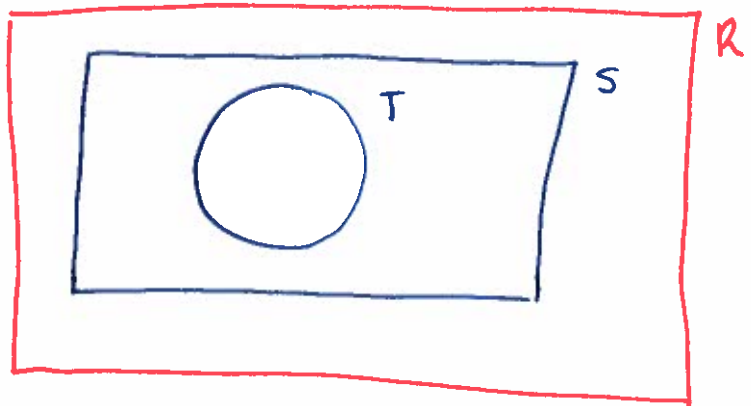
- ✓ Some basketball players are over 7 feet tall.
- ✓ Bob is a basketball player.
- ✗ Therefore, Bob is over 7 feet tall.

NOT VALID



- ✓ All teachers are smart.
- ✓ All smart people are rich.
- ✓ Therefore, all teachers are rich.

VALID!



- ✓ All rich people are happy.
- ✓ All celebrities are rich.
- ✓ Therefore, all celebrities are happy.

VALID!

