Example questions:

A={Amy, Bob, Carol}
B={Bob, Jake, Tara, Sam}
C={Sam, Carol, Bob, Fiona}
D={Lynn, Joseph, Amy}

Complete equation:
B' ∩C=
C-B=
(BUA) ∩(CUA) = {Amy,Bob,Carol,Jake,Tara,Sam}∩{Amy,Bob,Carol,Sam,Fiona}={Amy,Bob,Carol,Sam}
|D|=3
|DUA|=
|D∩A|=
P(A)=
AxD=
BxD={(Bob,Lynn), (Bob,Joseph), (Bob,Amy), (Jake,Lynn), (Jake,Joseph), (Jake,Amy), (Tara,Lynn), (Tara,Joseph), (Tara,Amy), (Sam,Lynn), (Sam,Joseph), (Sam,Amy)}

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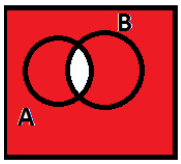
A={1,4,9,3}
B={3,6,7}
C={2,4,9}
U={1,2,3,4,5,6,7,8,9,10} *universal set*

Give elements and draw Venn diagram
A'
C-A
B' ∩C
(A∩B)'=({3})'={1,2,4,5,6,7,8,9,10}



Answer true or false:
{3,4}∈A
{3,4}∈B FALSE
2∈C TRUE
{2,9}⊆C
{3,6,7}⊂B

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Give elements:
A={x : x∈Z and 2x≤11}
B={3x | x∈N and x^2<25}
C={y | y=2x+1 and x∈N}
D={x | x∈R and 3x=5}=$\frac{5}{3}$

E={x : x∈Z and 3x=5}= ∅

In a class of students, 24 students own a pet parrot or a pet cat. 20 students own a pet cat, 8 students own a pet parrot. How many student own **both** a parrot and a cat?

|PUC|=24 |C|=20 |P|=8

|PUC|=|P|+|C|-|P∩C|

Both parrot and a cat: |P∩C| = |P|+|C|-|PUC| = 20+8-24 = **4**

In a group of friends, 10 people like dancing and 15 like singing. 5 people like **both** dancing and singing. How many people like only dancing? How many people like dancing or singing (including the people who like both as well)?

Give the truth table of:

(p∨q)→r

p'↔q

(p∨q) ∨(p'∧q')

p	Q	p∨q	p'	q'	p'∧q'	(p∨q)∨(p'∧q')
T	T	T	F	F	F	T
T	F	T	F	T	F	T
F	T	T	T	F	F	T
F	F	F	T	T	T	T

Use a truth table to prove:

a∨(b∧c)' ≡ (b→a)∨c'

(a∨c)' ≡ a'∧c'

r⊕t ≡ (r∧t') ∨ (r'∧t)

r	T	r⊕t	t'	r∧t'	r'	(r'∧t)	(r∧t') ∨ (r'∧t)
T	T	F	F	F	F	F	F
T	F	T	T	T	F	F	T
F	T	T	F	F	T	T	T
F	F	F	T	F	T	F	F

Apply propositional laws to find equivalent expression:

For example, a∨a ≡ a using idempotent law (you don't have to name law you are using)

(a')' ≡

a∨(b∧c) ≡ (a∨b) ∧ (a∨c) using distributive law

(a∨b)'

m = Maia likes comedy movies

p = There is a comedy movie playing in the theater
s = Jane wants to see Maia
g = Jane will go to the theater

Write each of the following as propositions using the four variables m, p, s, and g.
If there is a comedy movie playing in the theater and Maia likes comedy movies, Jane will not go to the theater.
$p \wedge m \rightarrow g'$
Jane will go to the theater if and only if Jane wants to see Maia.
Jane will go the theater or there is not a comedy movie playing in the theater. Moreover, Maia does not like comedy movies.