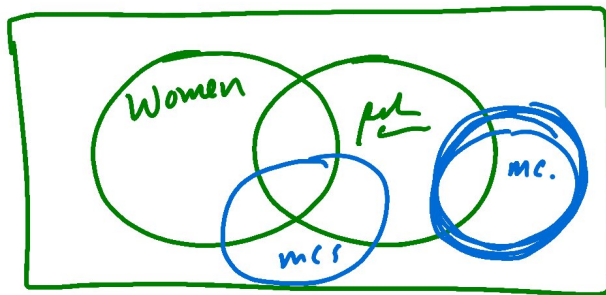17) 1. Some women are police officers
    2. Some police officers ride motorcycles
    _____
    ∴ Some women ride motorcycles

INVALID

42) banana   strawberry   asparagus   eggplant   orange

      y   r   g   P   <u>o</u>

Section 1.2 Symbolic Logic

A <u>statement</u> is a sentence that is either true or false.

 ex1: a) Apple manufactures computers.   Yes

      b) Apple manufactures the world's   No
         best computers.

      c) A $2000 computer that is discounted
         25% costs $1000.   Yes

We use lowercase letters for statements

compound statement : one or more simpler statements

negation - If p is a statement, ~p (not p)
    is its negation.

    p: It is snowing.

    ~p: It is not snowing.

ex 2 p13   a) p: The senator is a Democrat.

        ~p: The senator is not a Democrat.

    b) p: The senator is not a Democrat.

    ~p: The senator is a Democrat

    c) p: Some senators are Republican

    ~p: No senator is Republican
    It is not the case that some senators are Republican

All p are q   has   negation   some p are q

Some p are q   has   negation   no p are q

Conjunction - 2 or more statements connected with an and.
        p and q   ⟹ symbolically $p \land q$

ex 3 p14   p: Norma Rae is a union member
        q: Norma Rae is a Democrat

a) N.R. is a union member and she is a Democrat
$$p \wedge q$$
b) N.R. is a UM and she is not a Dem
$$p \wedge \sim q$$

disjunction p or $q \Rightarrow p \vee q$

ex4pl7 p: Juanita is a college grad.

    q: Juanita is employed.

a) $p \vee q$: Juanita is college grad or employed.

b) $\sim p \wedge q$: Juanita is not a college grad and she is employed.

conditional: If p, then $q \Rightarrow p \to q$

         ↑   ↑

    hypothesis   conclusion

ex: p: I am healthy

   q: I eat junk food

   r: I exercise regularly

first

a) I am healthy if I exercise regularly.

$\cancel{p \to r}$

$r \to p$

b) If I eat junk food and do not exercise, then

I am not healthy.

$$(q \wedge \sim r) \rightarrow \sim p$$

p. 17-19   1-29 odd