

## 2.3 Deductive Reasoning

Deductive reasoning - process of reasoning logically from given statements to a conclusion (FACTS)

Law of Detachment ( $p \rightarrow q$ )

\* If a conditional is true and its hypothesis is true, then its conclusion is true  
(If  $p \rightarrow q$  is true, and  $p$  is true, then  $q$  is true)

Ex. If  $M$  is the midpoint of a segment, then it divides the segment into two congruent segments.

$M$  is the midpoint of  $\overline{AB}$ .

Conclusion:  $M$  divides  $\overline{AB}$  into two  $\cong$  segments

Ex. If it is snowing, then the temperature is less than or equal to  $32^\circ\text{F}$ .

The temperature is  $20^\circ\text{F}$ .

Conclusion: Since I was given a condition and a conclusion I can't conclude that it's snowing

Law of Syllogism

\* If a conclusion from one statement is the hypothesis of another statement, then a conclusion can be stated from the two true conditional statements

(If  $p \rightarrow q$  and  $q \rightarrow r$  is true, then  $p \rightarrow r$  is true)

must be given condition of and the hypothesis to make conclusion

Ex. If a number is prime, then it does not have repeated factors.  
If a number does not have repeated factors, then it is not  
a perfect square.  
Conclusion: If a number is prime, then it is not a perfect square.