Direct proof

Conditional statement

If P is true, then Q is true. This can be abbreviated as $P(hypothesis) \Rightarrow Q(conclusion)$ and which is read 'P *implies* Q'

$$P(\text{“}if\ it\ is\ chicken\text{”}) \Rightarrow Q(\text{“}then\ it\ is\ poultry\text{”})$$

$$P(\text{“}if\ P\ is\ true\text{”}) \Rightarrow Q(\text{“}then\ Q\ is\ true\text{”})$$

then $P \Rightarrow Q$

Not all conditional statements will be true. If we switch the hypothesis and conclusion, then it will be false.

$$P(\text{“}if\ it\ is\ poultry\text{”}) \Rightarrow Q(\text{“}then\ it\ is\ chicken\text{”})$$

Direct proof

To give a direct proof of $P \Rightarrow Q$, we assume that the hypothesis P is true and then show that the conclusion Q is also true.

Exercise 1) Prove the following statements:

a) If a is odd and b is even, then a + b is odd.

b) If a is odd and b is odd, then ab is odd.

Exercise 2) Let $p, q \in Z$ such that p is divisible by 5 and q is divisible by 3. Prove that pq is divisible by 15.

Exercise 3) Let x and y be positive real numbers. Prove that if $x > y$, then $x^2 > y^2$.

Exercise 4) Let x and y be any two positive real numbers. Prove that $\frac{x+y}{2} \geq \sqrt{xy}$