Implication $p \Rightarrow q$

Def: An implication $p \Rightarrow q$ is a true if p is false or q is true.

p	q	$p \Rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

```
> Did not figure out yet "Vacuous Truth"
```

If and only if $p \Leftrightarrow q$

TODO

Axiom

Def: An axiom is a proposition that is "assumed" to be true

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> Axioms can be true in some fields, while false in others.
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Axioms should be: 1. consistent 2. complete

Def: A set of axioms is **consistent** if no proposition can be proved to be both true and false.

Def: A set of axioms is **complete** if it can be used to prove every proposition is either true or false.

Order of a differential equation

The **order** of a differential equation is the highest derivative that appears in the equation.

E.g. the order of $y'' + y' + y = 0$ is 2, because the highest derivative is y''.

$$d^2y/dx^2 \Rightarrow \text{2nd order ODE}$$

Degree of a differential equation

The **degree** of a differential equation is the power of the highest derivative that appears in the equation.

$$(\frac{d^2y}{dx^2})^1 + (\frac{dy}{dx})^3 = 8 \Rightarrow \text{degree 1st ODE}$$

Linear of differential equations

In D.E., both unknown function and its derivatives satisfy:

1. order is one ($y^{1/2}$ is not linear)

2. no times (y^2, $y \cdot y'$ are not linear)
3. no non-linear functions ($\sin(y)$, $\ln(y)$ are not linear)