Chapter 2

Inverse Trigonometric Functions

- Inverse functions
- Inverse trigonometric functions
  - Domain, Range and graph of inverse trigonometric functions
  - Functions of the form $f(f^{-1}(x))$, where f(x) is trigonometric function
- Principle value of the function $f^{-1}(x)$
- Relating different inverse trigonometric functions
  - Simplifying expression using trigonometric substitution
- Relating $f^{(-1)}(x)$ with $f^{(-1)}(-x)$ and $f^{(-1)}(\frac{1}{x})$
  - Relating $f(f^{(-1)}(x))$ with $f(f^{(-1)}(-x))$
  - Relating $f^{(-1)}(x)$ with $f^{(-1)}(\frac{1}{x})$
- Complementary angles
- Sum and difference of angles in terms of $\tan^{(-1)}$
- Multiple angles in terms of $\tan^{(-1)}(x)$
- Sum and difference of angles in terms of $\sin^{(-1)}$ and $\cos^{(-1)}$
- Multiple angles in terms of $\sin^{(-1)}(x)$ and $\cos^{(-1)}(x)$

INVERSE FUNCTION

Definition

If a function is bijective, mapping one-to-one and onto from set A to set B, then there exists an inverse function g. The function g associates each element $y \in B$ with one and only one element $x \in A$, such that $y = f(x)$. This inverse function of f is denoted by $x = g(y)$. Typically, we represent g as f^{-1} (read as "f inverse").

$$\therefore \quad x = f^{-1}(y).$$