

Handout #3 Some basic formulas, definitions and equations:

Basic trigonometric equations:

$$\sin x = a \quad (-1 \leq a \leq 1) \Leftrightarrow x = (-1)^n \arcsin a + n\pi \quad (n = 0, \pm 1, \pm 2, \dots)$$

$$\sin x = 0 \Leftrightarrow x = n\pi \quad (n = 0, \pm 1, \pm 2, \dots)$$

$$\sin x = 1 \Leftrightarrow x = \pi/2 + 2k\pi \quad (k = 0, \pm 1, \pm 2, \dots)$$

$$\sin x = -1 \Leftrightarrow x = -\pi/2 + 2k\pi \quad (k = 0, \pm 1, \pm 2, \dots)$$

$$\cos x = a \quad (-1 \leq a \leq 1) \Leftrightarrow x = \pm \arccos a + 2k\pi \quad (k = 0, \pm 1, \pm 2, \dots)$$

$$\cos x = 0 \Leftrightarrow x = \pi/2 + n\pi \quad (n = 0, \pm 1, \pm 2, \dots)$$

$$\cos x = 1 \Leftrightarrow x = 2k\pi \quad (k = 0, \pm 1, \pm 2, \dots)$$

$$\cos x = -1 \Leftrightarrow x = (2k + 1)\pi \quad (k = 0, \pm 1, \pm 2, \dots)$$

$$\tan x = a \Leftrightarrow x = \arctan a + k\pi \quad (k = 0, \pm 1, \pm 2, \dots)$$

$$\cot x = a \Leftrightarrow x = \operatorname{arccot} a + k\pi \quad (k = 0, \pm 1, \pm 2, \dots)$$

Definitions of inverse trigonometric functions:

$$\arcsin a = b \quad (-1 \leq a \leq 1) \Leftrightarrow a = \sin b \quad \text{and} \quad -\pi/2 \leq b \leq \pi/2$$

$$\arccos a = b \quad (-1 \leq a \leq 1) \Leftrightarrow a = \cos b \quad \text{and} \quad 0 \leq b \leq \pi$$

$$\arctan a = b \Leftrightarrow a = \tan b \quad \text{and} \quad -\pi/2 < b < \pi/2$$

$$\operatorname{arccot} a = b \Leftrightarrow a = \cot b \quad \text{and} \quad 0 < b < \pi$$

Some formulas:

$$\sqrt{a^2} = |a|$$

$$e^{\alpha \ln b} = b^\alpha$$

$$\log_b a = \frac{\ln a}{\ln b}$$