

Basic Forms for Precalculus

1. The Quadratic Formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Trigonometric Functions x, y, r Definitions :

$$2. \sin(t) = \frac{y}{r} \quad 3. \csc(t) = \frac{r}{y}$$

$$4. \cos(t) = \frac{x}{r} \quad 5. \sec(t) = \frac{r}{x}$$

$$6. \tan(t) = \frac{y}{x} \quad 7. \cot(t) = \frac{x}{y}$$

Basic Trigonometric Identities:

$$8. \sin^2(\theta) + \cos^2(\theta) = 1 \quad 9. \tan^2(\theta) + 1 = \sec^2(\theta) \quad 10. \tan^2(\theta) = \sec^2(\theta) - 1$$

$$11. \sin(\alpha + \beta) = \sin(\alpha)\cos(\beta) + \cos(\alpha)\sin(\beta)$$

$$12. \cos(\alpha + \beta) = \cos(\alpha)\cos(\beta) - \sin(\alpha)\sin(\beta)$$

$$13. \sin(2\alpha) = 2\sin(\alpha)\cos(\alpha)$$

$$14. \cos(2\alpha) = \cos^2(\alpha) - \sin^2(\alpha)$$

$$15. \sin^2(\theta) = \frac{1}{2}(1 - \cos(2\theta))$$

$$16. \cos^2(\theta) = \frac{1}{2}(1 + \cos(2\theta))$$

Basic Trigonometric Equations: In the Interval $[0, 2\pi)$

$$17. \sin(x) = 0 \Rightarrow x = 0 \text{ or } x = \pi$$

$$18. \cos(x) = 0 \Rightarrow x = \pi/2 \text{ or } x = 3\pi/2$$

$$19. \sin(x) = 1 \Rightarrow x = \frac{\pi}{2}$$

$$20. \cos(x) = 1 \Rightarrow x = 0$$

$$21. \sin(x) = -1 \Rightarrow x = \frac{3\pi}{2}$$

$$22. \cos(x) = -1 \Rightarrow x = \pi$$

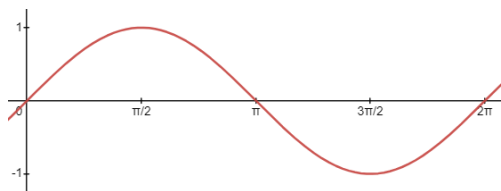
$$23. \tan(x) = 0 \Rightarrow x = 0 \text{ or } x = \pi$$

$$24. \tan(x) = 1 \Rightarrow x = \frac{\pi}{4} \text{ or } \frac{5\pi}{4}$$

$$25. \tan(x) = -1 \Rightarrow x = \frac{3\pi}{4} \text{ or } \frac{7\pi}{4}$$

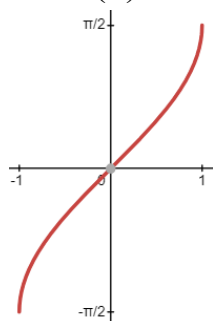
Graphs:

26. $f(x) = \sin(x)$



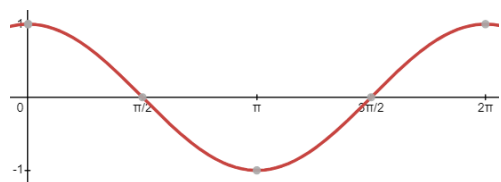
Domain: $(-\infty, \infty)$ Range: $[-1, 1]$

27. $f(x) = \sin^{-1}(x)$



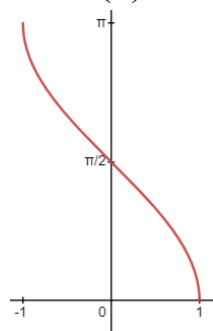
Domain: $(-\infty, \infty)$ Range: $[-1, 1]$

28. $f(x) = \cos(x)$



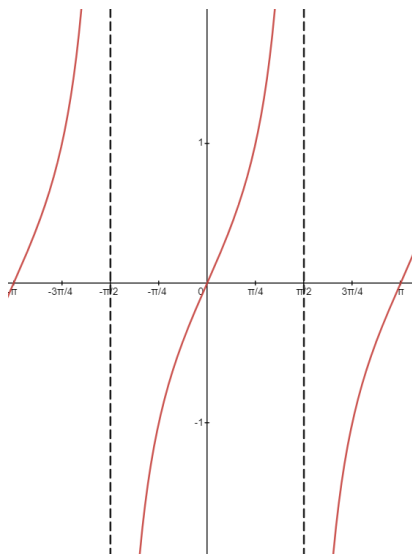
Domain: $(-\infty, \infty)$ Range: $[-1, 1]$

29. $f(x) = \cos^{-1}(x)$



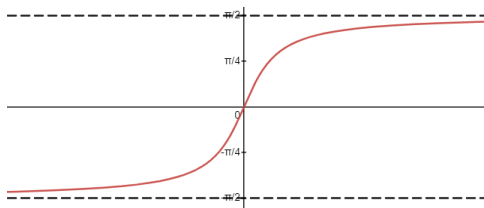
Domain: $[-1, 1]$ Range: $\left[0, \frac{\pi}{2}\right]$

30. $f(x) = \tan(x)$



Domain: $\mathbb{R} - \left\{(2k-1) \cdot \frac{\pi}{2}\right\}$
Range: $(-\infty, \infty)$

31. $f(x) = \tan^{-1}(x)$



Domain: $(-\infty, \infty)$
Range: $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$