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URL: http://www.jjw3.com/r/cot.pdf

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1 Cotangent Function

1.1 Graph

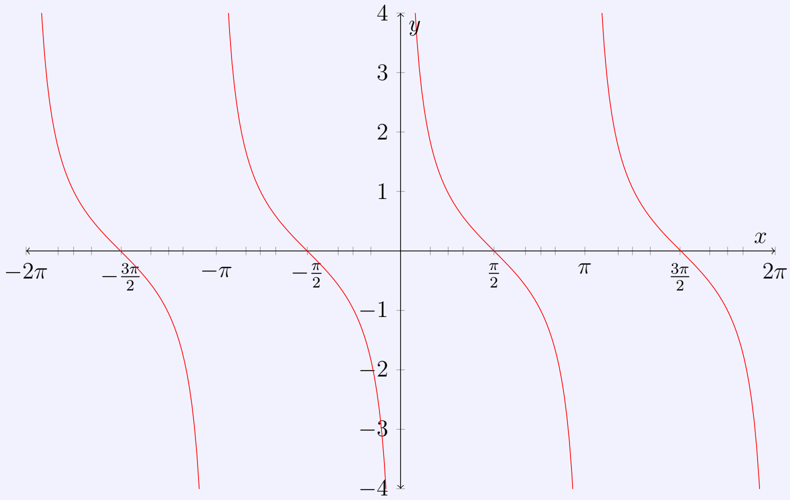

Figure 1: $f(x) = \cot(x)$

1.2 Properties of Graph

- domain: $x \neq n\frac{\pi}{2}$, $n \in \mathbb{Z}$
- range: $y \in (-\infty, \infty)$
- x-intercepts: $x = (2n+1)\frac{\pi}{2}$, $n \in \mathbb{Z}$
- y-intercept: n/a
- period: π
- vertical asymptotes: none
- horizontal asymptotes: none
- symmetry: origin, i.e., odd function

1.3 Unit Circle

$\tan(\theta) = \frac{y}{x}$ on the unit circle. In the xy-plane, $\cot(\theta) < 0$ when x and y are opposite in sign, i.e., in Quadrant II [i.e., $x < 0$ and $y > 0$] and Quadrant IV [i.e., $x > 0$ and $y < 0$].

1.4 Mathematica Code

1.4.1 Angles in Degrees

Cot[x Degree], e.g., Cot[30 Degree].

All *Mathematica* functions start with an upper case letter and have square brackets for arguments.

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1.4.2 Angles in Radians

Cot[x], e.g., Cot[Pi/6].

2 Inverse Cotangent Function

2.1 Graph

$$\cot^{-1}(x) \neq \frac{1}{\cot(x)}$$

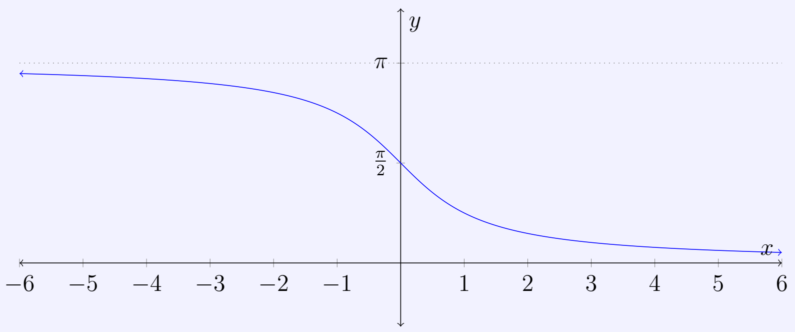

Figure 2: $f(x) = \cot^{-1}(x)$

2.2 Properties of Graph

The domain of the inverse is the same as the range of $\cot(x)$.

To find the inverse, the domain of $\tan(x)$ must be restricted to $(0, \pi)$ to make the function 1-to-1.

- domain: $x \in (-\infty, \infty)$
- range: $y \in (0, \pi)$
- x-intercept: n/a
- y-intercept: $y = \frac{\pi}{2}$
- period: n/a
- vertical asymptotes: none
- horizontal asymptotes: $y = 0, \pi$
- symmetry: none

2.3 Mathematica Code

2.3.1 To Obtain Angles in Radians

ArcCot[x], e.g., ArcCot[1].

Mathematica returns on the standard reference angle.

2.3.2 To Obtain Angles in Degrees

ArcCot[x]/Degree//N, e.g., ArcCot[1]/Degree//N.