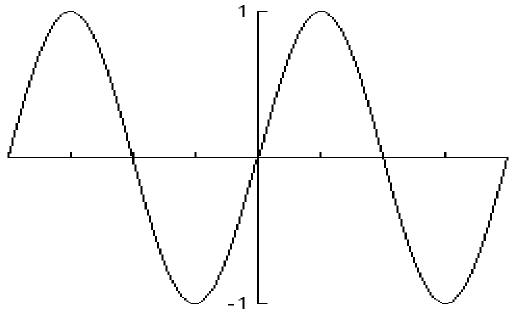
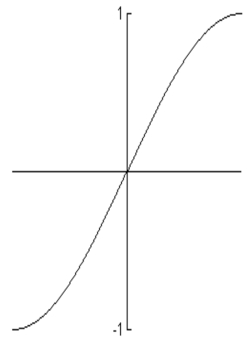
1.The sine function on [-2π, 2π]





Sine is not a one-to-one function. If the domain of the sine function is restricted to [-π/2, π/2], then it is a one-to-one function. The sine inverse function $\sin^{-1}$ or arcsin has a domain of [-1, 1] and a range of [-π/2, π/2]. Note: by similar restrictions, the inverse cosine and inverse tangent functions can be defined.

2. Summary of inverse trig functions

$\sin^{-1} x = y \Leftrightarrow \sin y = x$ and $-\pi/2 \le y \le \pi/2$

$\cos^{-1} x = y \Leftrightarrow \cos y = x$ and $0 \le y \le \pi$

$\tan^{-1} x = y \Leftrightarrow \tan y = x$ and $-\pi/2 < y < \pi/2$

3. Compute the exact value:

A. $\csc^{-1}(2)$

B. $\tan^{-1}(\sqrt{3})$

C. csc(arccos 3/5)

3. D. $\cos(\tan^{-1} 2 + \tan^{-1} 3)$

4. Simplify: $\cos(2\tan^{1} x)$

5. The derivative formulas for arcsin, arccos, and arctan:

$$\frac{d}{dx}\left(\sin^{-1} x\right) = \frac{1}{\sqrt{1 - x^2}} \qquad \frac{d}{dx}\left(\cos^{-1} x\right) = -\frac{1}{\sqrt{1 - x^2}} \qquad \frac{d}{dx}\left(\tan^{-1} x\right) = \frac{1}{1 + x^2}$$

Write the "chain rule" form for these three formulas:

6. Differentiate:

A. $y = \tan^{-1}(e^{2x})$

B. $y = \cos^{-1}(\sin^{-1}x)$

C. $y = \arccos(\sqrt{\cos\theta})$