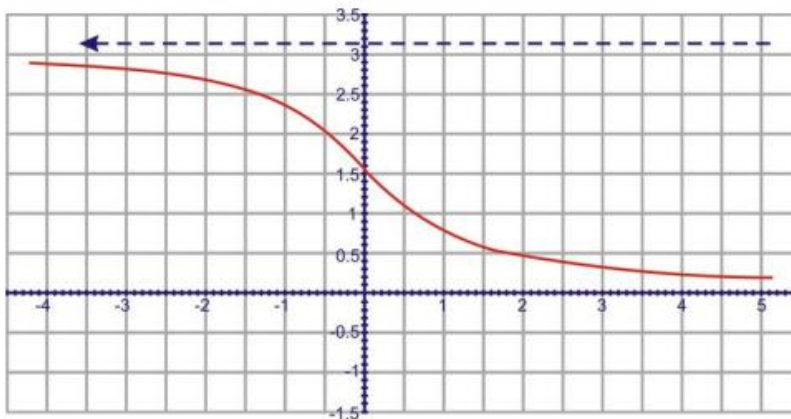


4.3 Inverse Trigonometric Properties

6. The domain is all real numbers and the range is from $(0, \pi)$. There is an x -intercept at $\frac{\pi}{2}$.



7. Answers:

a.

$$\begin{aligned}\cos \theta &= \frac{5}{13} \\ \sin \left(\cos^{-1} \left(\frac{5}{13} \right) \right) &= \sin \theta \\ \sin \theta &= \frac{12}{13}\end{aligned}$$

- b. $\tan \left(\sin^{-1} \left(-\frac{6}{11} \right) \right) \rightarrow \sin \theta = -\frac{6}{11}$. The third side is $b = \sqrt{121 - 36} = \sqrt{85}$. $\tan \theta = -\frac{6}{\sqrt{85}} = -\frac{6\sqrt{85}}{85}$
 c. $\cos \left(\csc^{-1} \left(\frac{25}{7} \right) \right) \rightarrow \csc \theta = \frac{25}{7} \rightarrow \sin \theta = \frac{7}{25}$. This two lengths of a Pythagorean Triple, with the third side being 24. $\cos \theta = \frac{24}{25}$

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8. Answers:

- a. $\frac{1}{x^2+1}$
 b. $\frac{1}{x^2}$

9. The adjacent side to θ is $\sqrt{1-x^2}$, so the three trig functions are:

a.

$$\begin{aligned}\sin(\sin^{-1} x) &= \sin \theta = x \\ \cos(\sin^{-1} x) &= \cos \theta = \sqrt{1-x^2} \\ \tan(\sin^{-1} x) &= \tan \theta = \frac{x}{\sqrt{1-x^2}}\end{aligned}$$

b.

$$\tan(\sin^{-1}(2x^3)) = \frac{2x^3}{\sqrt{1-(2x^3)^2}} = \frac{2x^3}{\sqrt{1-4x^6}}$$

10. The opposite side to θ is $\sqrt{1-x^2}$, so the three trig functions are:

a.

$$\sin(\cos^{-1}x) = \sin\theta = \sqrt{1-x^2}$$

$$\cos(\cos^{-1}x) = \cos\theta = x$$

$$\tan(\cos^{-1}x) = \tan\theta = \frac{\sqrt{1-x^2}}{x}$$

b.

$$\sin^2\left(\cos^{-1}\left(\frac{1}{2}x\right)\right) = \left(\sqrt{1-\left(\frac{1}{2}x\right)^2}\right)^2 = 1 - \frac{1}{4}x^2$$