

Assignment

Write

Explain how the tangent function is related to the sine and cosine functions.

Remember

The tangent function is positive when $\sin \theta$ and $\cos \theta$ have the same sign, and the tangent function is negative when $\sin \theta$ and $\cos \theta$ have different signs.

The period of the function $y = \tan x$ is π radians.

The periodicity identity for the tangent function is written as $\tan(x + \pi) = \tan x$.

Practice

1. Consider Manuel's incorrect work. Identify the errors and correctly determine $\tan\left(\frac{7\pi}{3}\right)$.

Manuel

$$\begin{aligned}\tan\left(\frac{7\pi}{3}\right) &= \tan\left(\frac{6\pi}{3} + \pi\right) \\ &= \tan\left(\frac{6\pi}{3}\right) \\ &= \tan(2\pi) \\ &= 0\end{aligned}$$



2. Given $\tan \theta = -\sqrt{3}$. Determine 2 values for θ such that $\theta < 0$ and 2 values for θ such that $\theta > 2\pi$.

3. Given $\tan \theta = 1$. Determine 2 values for θ such that $\theta < 0$ and 2 values for θ such that $\theta > 2\pi$.

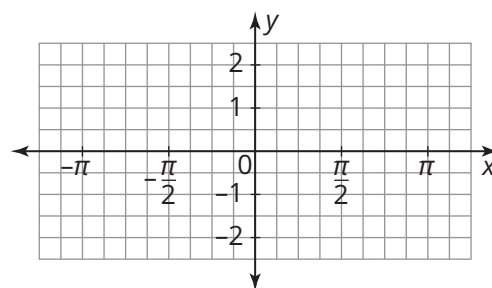
4. Determine $\tan\left(\frac{13\pi}{6}\right)$.

5. Determine $\tan\left(\frac{11\pi}{4}\right)$.

6. To create the function $g(x)$, the function $f(x) = \tan x$ was reflected across the x -axis and shifted $\frac{\pi}{2}$ radians to the right.

a. Graph the function $g(x)$.

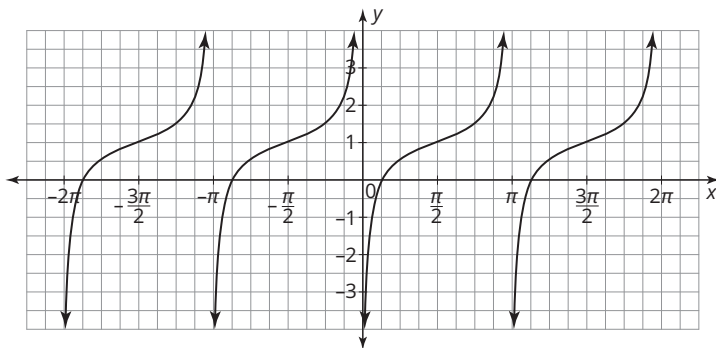
b. Write the function $g(x)$.



7. The function $f(x) = \tan x$ has been horizontally stretched by a factor of 4 and shifted down 3 units to create the function $m(x)$. Write the function $m(x)$.

Stretch

1. Consider the graph of a trigonometric function $g(x)$.



Write the function $g(x)$, a transformation of the function $f(x) = \tan x$.

2. Determine the values of θ in radians that would make each equation true for $0 \leq \theta \leq 2\pi$.
- a. $\cos \theta = 1$ b. $\cos \theta = 0$ c. $\cos \theta = \frac{\sqrt{3}}{2}$ d. $\cos \theta = -\frac{1}{2}$ e. $\cos(\theta) + 1 = 0$

Review

1. Determine θ and $\cos \theta$ when $\sin \theta = -\frac{\sqrt{2}}{2}$ and $\cos \theta$ is negative. Restrict values for θ such that $0 \leq \theta \leq 2\pi$.
2. Determine $\sin\left(\frac{15\pi}{4}\right)$.
3. Priscilla and Theo both bought farms the same year, and each dedicated one acre of the land for growing strawberries. The first year of operation, Priscilla's strawberry field yielded 22,000 pounds and Theo's field yielded 19,500 pounds. Since that first year, Priscilla's yield of strawberries has decreased by 1.5% each year while Theo's yield of strawberries has increased by 1.0% each year.
- a. Whose farm yielded more strawberries in the 7th year of production? Round decimals to the nearest hundredth.
- b. Which of the 2 farms had the biggest yield over the first 7 years? Round decimals to the nearest hundredth.
4. Use long division to determine whether $x + 2$ is a factor of $2x^4 + 5x^3 + 5x^2 + 10x + 8$. Show your work.