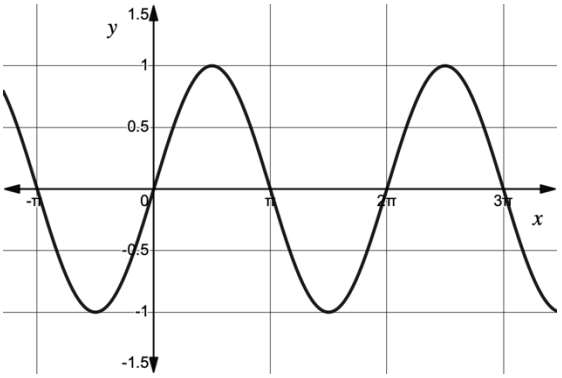
Caution: Restricted Area

We have seen how we can use the unit circle or the graphs of trigonometric functions to evaluate the sine, cosine, and tangent ratios at various angles. But what if we are given a ratio and want to find the angle?

1. Evaluate:
   a. $\sin\left(\frac{7\pi}{6}\right)$ b. $\sin\left(-\frac{\pi}{6}\right)$ c. $\sin\left(\frac{11\pi}{6}\right)$ d. $\sin\left(\frac{19\pi}{6}\right)$

2. Plot the ordered pairs from question 1 on the graph shown to the right.



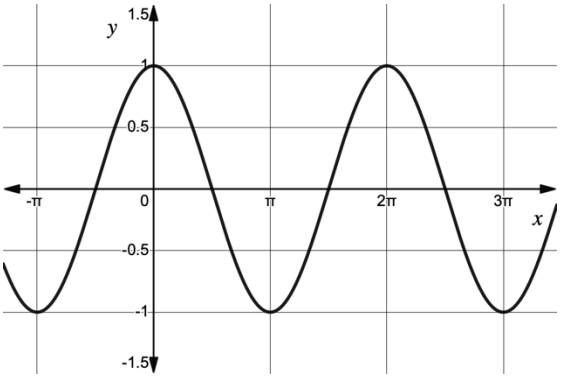
3. How many solutions are there to the equation $\sin\theta = -\frac{1}{2}$?

   How would you evaluate $\sin^{-1}\left(-\frac{1}{2}\right)$?

4. Is $y = \sin\theta$ a one-to-one function? Why is this important?

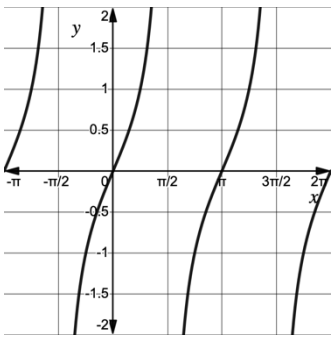
5. Restrict the domain of the graph above to give the longest possible interval with no repeated outputs.

6. Can you use the same interval to restrict the domain of $y = \cos\theta$? If not, what interval could you use?



7. Use your interval from #6 to evaluate $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$. How many answers should you get?

8. On what interval is $y = \tan x$ one-to-one?



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Lesson 7.2 – Inverse Trig Functions

QuickNotes

Check Your Understanding

1. Evaluate each expression or explain why it is not possible.

   a. $\arcsin\frac{-\sqrt{2}}{2}$ b. $\tan^{-1}\left(\frac{-\sqrt{3}}{3}\right)$ c. $\arccos 3\pi$

2. Determine if each statement is true or false. Give a reason for your answer.

   a. $\arcsin\left[\sin\left(\frac{5\pi}{6}\right)\right] = \frac{5\pi}{6}$ b. $\cos\left[\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)\right] = \frac{-\sqrt{2}}{2}$

3. a. How many values of x satisfy the equation $\tan x = -1$?

   b. How many values of x satisfy the equation $\tan^{-1}(-1) = x$?

4. Let $f(\theta) = \cos\theta$. If (a, b) is on the graph of f and (b, a) is on the graph of f^{-1}, which of the following statements is FALSE?

   A) $-1 \le b \le 1$

   B) $0 \le a \le \pi$

   C) $(b, a + 2\pi)$ is also on the graph of f^{-1}.

   D) $(-a, b)$ is also on the graph of f.