Precalculus
The inequality $b \geq \sin\theta \geq a$

Todor Milev

2019

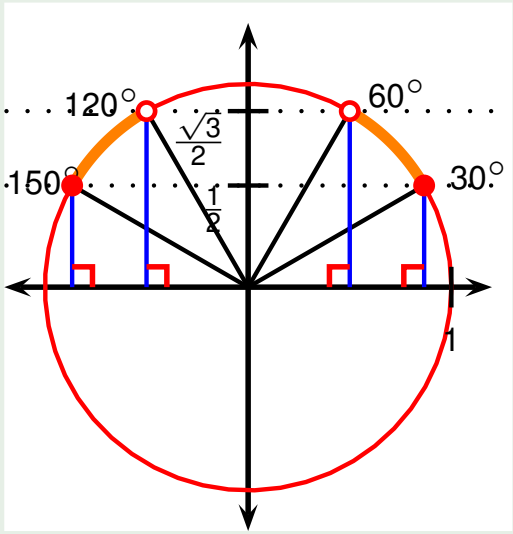
Example

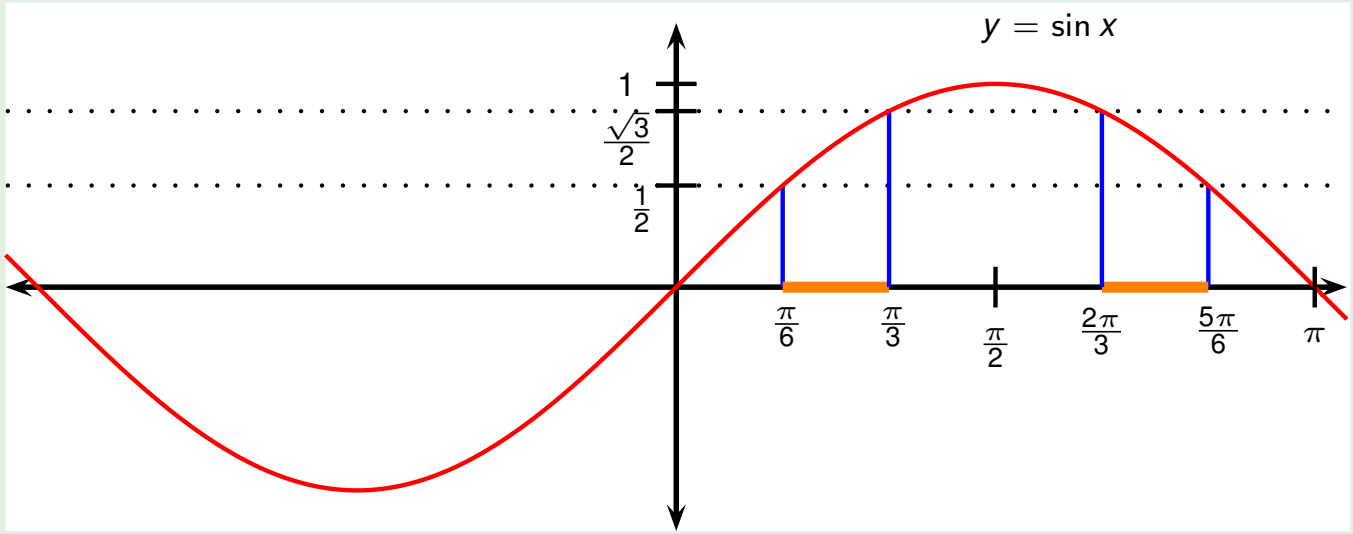
Solve. Among your solutions, find those between $-360°$ and $450°$.

$\frac{1}{2} \leq \sin\theta < \frac{\sqrt{3}}{2}$

$x \in [30° + k360°, 60° + k360°) \cup (120° + k360°, 150° + k360°]$

$$
\begin{array}{rc|l}
 & \cdots & \\
 & \cup [-690°, -660°) \cup (-600°, -570°] & k = -2 \\
 & \cup [-330°, -300°) \cup (-240°, -210°] & k = -1 \\
x \in & \cup [30°, 60°) \cup (120°, 150°] & k = 0 \\
 & \cup [390°, 420°) \cup (480°, 510°] & k = 1 \\
 & \cdots &
\end{array}
$$





Example

Solve. Among your solutions, find those between $-360°$ and $450°$.

$\frac{1}{2} \leq \sin\theta < \frac{\sqrt{3}}{2}$

$x \in [30° + k360°, 60° + k360°) \cup (120° + k360°, 150° + k360°]$

$$x \in \begin{array}{c} \cancel{\cup\,[-690°, -660°) \cup (-600°, -570°]} \\ \cup\,[-330°, -300°) \cup (-240°, -210°] \\ \cup\,[30°, 60°) \cup (120°, 150°] \\ \cancel{\cup\,[390°, 420°) \cup (480°, 510°]} \end{array} \quad \begin{array}{|l} \cancel{k = -2} \\ k = -1 \\ k = 0 \\ \cancel{k = 1} \end{array}$$

In radians:

$$x \in \left[-\frac{11\pi}{6}, -\frac{5\pi}{3}\right) \cup \left[-\frac{4\pi}{3}, -\frac{7\pi}{6}\right) \cup \left[\frac{\pi}{6}, \frac{\pi}{3}\right) \cup \left[\frac{2\pi}{3}, \frac{5\pi}{6}\right) \cup \left[\frac{13\pi}{6}, \frac{7\pi}{3}\right)$$