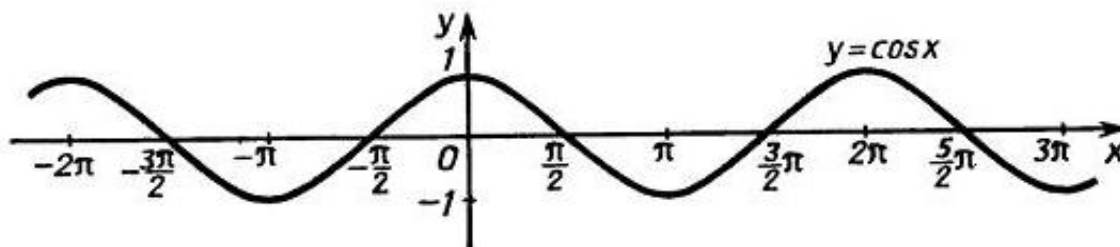Determine the domain over which the following functions are monotonically increasing or decreasing for $y = \cos x$ and for $y = \tan x$

Solution:
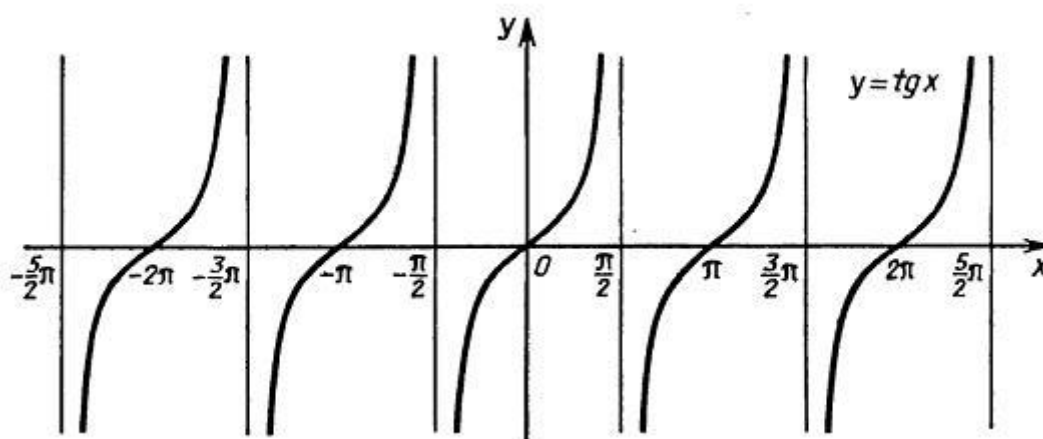
1. The graph of $y = \cos x$:

The function $\cos x$ is

monotonically increasing in the intervals $x \in [\pi + 2\pi n, 2\pi + 2\pi n], \ n \in Z$,

and it monotonically decreasing in the intervals $x \in [2\pi n, \pi + 2\pi n], n \in Z$.

2. The graph of $y = \tan x$

The function $\tan x$ is monotonically increasing in the intervals

$$x \in \left(-\frac{\pi}{2} + \pi n, \frac{\pi}{2} + \pi n\right), \qquad n \in Z$$