Practice For Quiz

(1) Evaluate $\cos\left(\frac{5\pi}{3}\right) - \sin\left(\frac{7\pi}{6}\right)$

(2) Find domain of the function $f(x) = \dfrac{\sqrt{x}}{(e^x+1)\cos x}$

(3) Find all values in $[0, 2\pi]$ that solve

$$\left(e^{2x-1} - 1\right)(2\sin x - 1) = 0$$

Quiz at ?

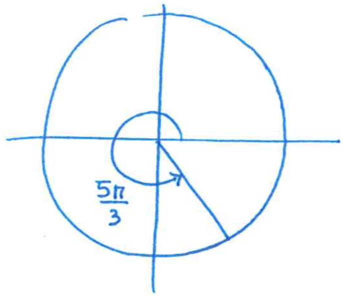
$\boxed{\text{A. Start of the class}}$

B. End of the class

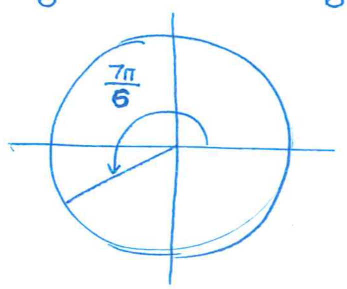
Solution to Practice Quiz

(1)

$$\cos\left(\frac{5\pi}{3}\right) = \cos\left(\frac{6\pi-\pi}{3}\right) = \cos\Big(\underbrace{2\pi - \overset{\text{reference}}{\frac{\pi}{3}}}_{4^{th}\text{ quad}}\Big) = \frac{1}{2}$$



$$\sin\left(\frac{7\pi}{6}\right) = \sin\left(\frac{6\pi+\pi}{6}\right) = \sin\Big(\underbrace{\pi + \overset{\text{reference}}{\frac{\pi}{6}}}_{3^{rd}\text{ quad}}\Big) = -\frac{1}{2}$$



So $\cos\left(\frac{5\pi}{3}\right) - \sin\left(\frac{7\pi}{6}\right) = \frac{1}{2} - \left(-\frac{1}{2}\right) = 1.$

( ) Domain of $f(x) = \dfrac{\sqrt{x}}{(e^x+1)\cos x}$

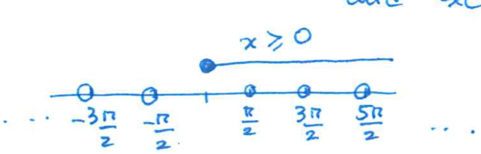
for the top : $x \geq 0$

for the bottom : exclude x-values that $e^x+1=0$ or $\cos x = 0$

- $e^x + 1 = 0 \Rightarrow e^x = -1 \Rightarrow$ NO x, as e^x returns only positive values.

- $\cos x = 0 \Rightarrow x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2},$ also $x = -\frac{\pi}{2}, -\frac{3\pi}{2}, \ldots$ i.e. $x = \frac{\pi}{2} + n\pi$, $n = 0, \pm 1, \pm 2,$

Domain : all positive x's $(x \geq 0)$ and exclude $\frac{\pi}{2} + n\pi$ → we don't need to consider negative x like $-\frac{\pi}{2}, -\frac{3\pi}{2}, \ldots$ because they cannot go into $\sqrt{x}$



$\Rightarrow$ Domain : $x \geq 0$ and $x \neq \frac{\pi}{2} + n\pi$ for $n = 0, 1, 2, 3, \ldots$

(3) $\left(e^{2x-1} - 1\right)\left(2\sin x - 1\right) = 0$. Find x:

$e^{2x-1} - 1 = 0$

or $2\sin x - 1 = 0$

if $e^{2x-1} - 1 = 0 \Rightarrow e^{2x-1} = 1 = e^{0}$

$\Rightarrow 2x - 1 = 0 \Rightarrow \boxed{x = \frac{1}{2}}$

if $2\sin x - 1 = 0 \Rightarrow \sin x = \frac{1}{2} \Rightarrow \boxed{x = \frac{\pi}{6}, \frac{5\pi}{6}}$

All three solutions are in the domain of the functions in the equations so we take all three of them as solutions to the equation.