$f(x) = \sin(x) + \cos(x)$

$f'(x) = \cos(x) - \sin(x)$

$f''(x) = -\sin(x) - \cos(x)$

$f(x) = 0 \Rightarrow \sin(x) + \cos(x) = 0$

$\Rightarrow \sin(x) = -\cos(x)$

$\Rightarrow \tan(x) = -1$

$x = 2\pi + \arctan(-1) = 2\pi - \frac{\pi}{4} = \frac{7\pi}{4}$

OR $\pi + \arctan(-1) = \pi - \frac{\pi}{4} = \frac{3\pi}{4}$

$\left(\frac{7\pi}{4}, 0\right)$

$\left(\frac{3\pi}{4}, 0\right)$

(x INT)

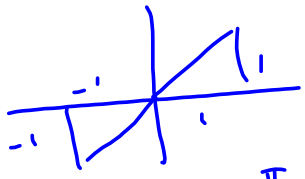
$\sin(x) + \sin\left(\frac{\pi}{2} - x\right)$

$= \sin(x) + \sin\frac{\pi}{2}\cos(-x) + \sin(-x)\cos\frac{\pi}{2}$

$f'(x) = \cos(x) - \sin(x) = 0 \Rightarrow$

$\cos(x) = \sin(x) \Rightarrow$

$1 = \frac{\sin(x)}{\cos(x)} = \tan(x)$



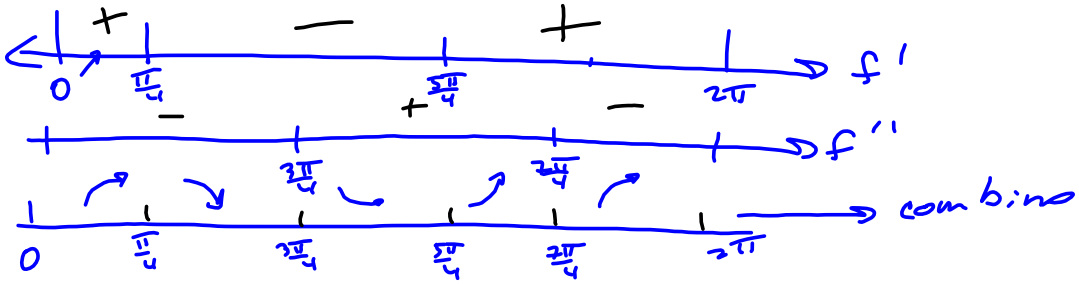
$x = \frac{\pi}{4}, \pi + \frac{\pi}{4}$ → $\arctan(1)$

↳ $\arctan(1)$

$f' = 0$ @ $x = \frac{\pi}{4}, \frac{5\pi}{4}$

$f''(x) = -\sin(x) - \cos(x) = -f(x) \overset{SET}{=} 0$

$x = \frac{3\pi}{4}, \frac{7\pi}{4}$ IDS



f':

$[0, \frac{\pi}{4})$	$\frac{\pi}{6}$	$f'(\frac{\pi}{6}) = \cos\frac{\pi}{6} - \sin\frac{\pi}{6} > 0$	+
$(\frac{\pi}{4}, \frac{5\pi}{4})$	$\frac{\pi}{2}$	$f'(\frac{\pi}{2}) = \cos\frac{\pi}{2} - \sin\frac{\pi}{2} < 0$	−
$(\frac{5\pi}{4}, 2\pi]$	$\frac{3\pi}{2}$	$\cos(\frac{3\pi}{2}) - \sin(\frac{3\pi}{2}) > 0$	+

f''

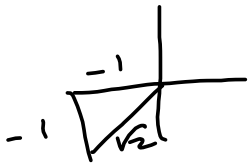
$[0, \frac{3\pi}{4})$	$\frac{\pi}{2}$	$-\sin(\frac{\pi}{2}) - \cos(\frac{\pi}{2}) = -1 < 0$	
$(\frac{3\pi}{4}, \frac{7\pi}{4})$	$\frac{3\pi}{2}$	$-\sin(\frac{3\pi}{2}) - \cos(\frac{3\pi}{2}) = 1 > 0$	
$(\frac{7\pi}{4}, 2\pi)$	$\frac{11\pi}{6}$	$-\sin\frac{11\pi}{6} - \cos(\frac{11\pi}{6}) = -(-\frac{1}{2}) - \frac{\sqrt{3}}{2} = < 0$	

$f(x)=0$: $\left(\frac{3\pi}{4},0\right), \left(\frac{7\pi}{4},0\right)$

$f'=0$

$f\left(\frac{\pi}{4}\right)$ $\sin\left(\frac{\pi}{4}\right)+\cos\left(\frac{\pi}{4}\right)=\sqrt{2}$

$f\left(\frac{5\pi}{4}\right)$ $\sin\frac{5\pi}{4}+\cos\frac{5\pi}{4}=-\sqrt{2}$



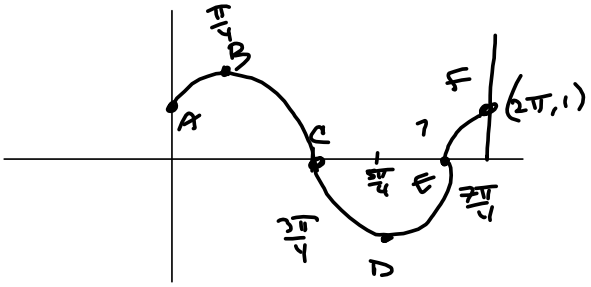
$f''=0$

$f\left(\frac{3\pi}{4}\right)$ $\sin\left(\frac{3\pi}{4}\right)+\cos\left(\frac{3\pi}{4}\right)=0$

$f\left(\frac{7\pi}{4}\right)$ $\sin\left(\frac{7\pi}{4}\right)+\cos\left(\frac{7\pi}{4}\right)=0$

} Already knew this dingbat!

$f(0)=\sin(0)+\cos(0)=f(2\pi)=1$



$A=(0,1)$ Endpt

$B=\left(\frac{\pi}{4},\sqrt{2}\right)$ MAX

$C=\left(\frac{3\pi}{4},0\right)$ IP/INT

$D=\left(\frac{5\pi}{4},-\sqrt{2}\right)$ MIN

$E=\left(\frac{7\pi}{4},0\right)$ IP/INT

$F=(2\pi,1)$

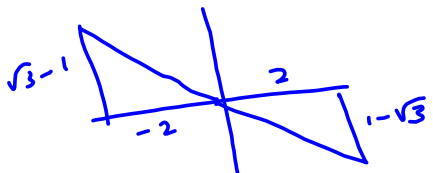
$\arctan\left(\frac{3}{4}\right)$ is exact

EXACT, when it's not pretty

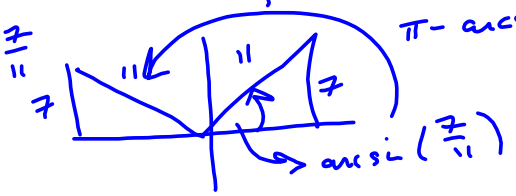
$2\pi+\arctan\left(-\frac{4}{3}\right)=2\pi-\arctan\left(\frac{4}{3}\right)$

$\pi+\arctan\left(-\frac{4}{3}\right)=\pi-\arctan\left(\frac{4}{3}\right)$

$\tan(x) = \frac{1-\sqrt{3}}{2}$



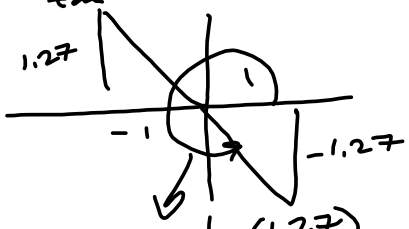
$\sin(x) = \frac{7}{11}$



$\pi - \arcsin\left(\frac{7}{11}\right)$

$\arcsin\left(\frac{7}{11}\right)$

$\tan(x) = -1.27$



$2\pi + \arctan(-1.27)$

$\pi + \arctan(-1.27)$