ag7890-HW3 HPC Extra credit

Q2)

Idea:

$$WKT \quad e^{ix} = \left(1 - \frac{x^2}{2!} + \frac{x^4}{4!} \cdots\right) + i\left(x - \frac{x^3}{3!} + \frac{x^5}{5!} \cdots\right)$$

$$\underbrace{\qquad}_{\cos x} \qquad \underbrace{\qquad}_{\sin x}$$

Given hint in Question: $e^{i(x+\pi/2)} = ie^{ix}$

$$\Rightarrow e^{i(x+\pi/2)} = ie^{ix} = i\left(1 - \frac{x^2}{2!} + \frac{x^4}{4!} + \cdots\right) + (-1)\left(x - \frac{x^3}{3!} + \frac{x^5}{5!} \cdots\right)$$

$$\underbrace{\qquad}_{\sin x} \qquad \underbrace{\qquad}_{\cos x}$$

```
[ag7890@access2 homework3]$ ./fast-sin
Reference time: 0.0001
Taylor time:    0.0000          Error: 6.928125e-12
Intrin time:    0.0000          Error: 6.928125e-12
Vector time:    0.0000          Error: 2.454130e-03

----------Calculations for outside [-pi/2, pi/2]-----------
Reference time: 0.0001
Taylor time:    0.0000          Error: 1.041124e+00
Vector time:    0.0000          Error: 1.041124e+00
```