2.17.2 $\left(\dfrac{1+i\sqrt{3}}{\sqrt{2}+i\sqrt{2}}\right)^{50} = ?$

Numerator:

$$1+i\sqrt{3} = 2\left(\frac{1}{2}+i\frac{\sqrt{3}}{2}\right) = 2\left(\cos\frac{\pi}{3}+i\sin\frac{\pi}{3}\right) = 2e^{i\frac{\pi}{3}}$$

Denominator:

$$\sqrt{2}+i\sqrt{2} = 2\left(\frac{1}{\sqrt{2}}+i\frac{1}{\sqrt{2}}\right) = 2\left(\cos\frac{\pi}{4}\right)+i\sin\frac{\pi}{4}\Big) = 2e^{i\frac{\pi}{4}}$$

$$\frac{1+i\sqrt{3}}{\sqrt{2}+i\sqrt{2}} = \frac{2e^{i\frac{\pi}{3}}}{2e^{i\frac{\pi}{4}}} = e^{i\frac{\pi}{12}}$$

$$\left(\frac{1+i\sqrt{3}}{\sqrt{2}+i\sqrt{2}}\right)^{50} = e^{i\pi\frac{50}{12}} = \underbrace{e^{i\pi\cdot 4}}_{= 1} \cdot e^{i\pi\frac{1}{6}} = \boxed{\frac{\sqrt{3}}{2}+i\frac{1}{2}}$$

2.17.6 $(-e)^{i\pi} = \left[(-1)\cdot e\right]^{i\pi} = (-1)^{i\pi}\cdot \underbrace{e^{i\pi}}_{= -1} =$

$$= -(-1)^{i\pi} = -e^{i\pi \ln(-1)} = -e^{i\pi(i\pi + 2i\pi n)}$$

$$= \boxed{-e^{-\pi^2(2n+1)}} \qquad n = 0, \pm 1, \pm 2 \ldots$$

2.17.26

$$\left| \frac{2e^{i\theta} - i}{i e^{i\theta} + 2} \right| = ?$$

$$\left| \frac{2e^{i\theta} - i}{i e^{i\theta} + 2} \right| = \frac{|2e^{i\theta} - i|}{|i e^{i\theta} + 2|} =$$

$$= \frac{|2e^{i\theta} - i|}{|e^{i\theta}(i + 2e^{-i\theta})|} = \frac{|2e^{i\theta} - i|}{\underbrace{|e^{i\theta}|}_{=1} \, |2e^{-i\theta} + i|} =$$

$$= \frac{|2e^{i\theta} - i|}{|\overline{2e^{i\theta} - i}|} = \boxed{1}$$

2.17.32

$$\sum_{n=0}^{\infty} \frac{(1 + i\pi)^n}{n!} = e^{(1 + i\pi)} =$$

$$= e \cdot \underbrace{e^{i\pi}}_{= -1} = -e$$