H-2. I used an HP 28C calculator (it's about 20 years old)

(a) $\dfrac{1}{1+i} = (.5, -.5) = .707\angle -45^\circ = .707\angle -.785^r$

(b) $\dfrac{3+i}{1+3i} = (.6, -.8) = 1\angle -53.1^\circ = 1\angle -.927^r$

(c) $25e^{2i} = 25\angle 2^r = 25\angle 115^\circ$

(d) $(1/(1+i))^* = (.5, -.5)^* = (.5, +.5) = .707\angle 45^\circ = .707\angle .785^r$

(e) $\left|\dfrac{1}{(1+i)}\right| = |(.5, -.5)| = .707 = .707\angle 0$

H-3. (a) $\dfrac{3i-7}{i+4} = (-1.47, 1.12)$

(b) $(.64 + .77i)^4 = (-.938, -.361)$

(c) $\sqrt{3+4i} = (2, 1)$

(d) $25e^{2i} = (-10.4, 22.7)$

(e) $\ln(-1) = (0, 3.14)$

H-4. $1.32e^{.253i} + 3.21e^{.532i} + 2.13e^{.325i} = (6.06, 2.64) = 6.61\angle .411^r$

So: $\displaystyle\sum_{k=1}^{3} a_k \cos(\omega t + \delta_k) = 6.61 \cos(\omega t + .411)$

H-7. Substituting $I = I_0\, e^{i\omega t}$ (but remembering in the end we want only the real part!) into

$$L\frac{dI}{dt} + R\,I = V_0\, e^{i\omega t}$$

yields:

$$\begin{aligned} (Li\omega + R)\, I_0\, e^{i\omega t} &= V_0\, e^{i\omega t} \\ (Li\omega + R)\, I_0 &= V_0 \\ I_0 &= \frac{V_0}{Li\omega + R} \end{aligned}$$

We can express $Li\omega + R$ in polar form: $A\, e^{i\phi}$ where $A = \sqrt{R^2 + (L\omega)^2}$ and $\phi = \tan^{-1}(L\omega/R)$, so

$$\begin{aligned} I_0 &= \frac{V_0}{Li\omega + R} \\ &= \frac{V_0}{\sqrt{R^2 + (L\omega)^2}\; e^{i\phi}} \\ &= \frac{V_0}{\sqrt{R^2 + (L\omega)^2}}\; e^{-i\phi} \end{aligned}$$

and

$$I = \operatorname{Re}\left(I_0\, e^{i\omega t}\right) = \operatorname{Re}\left(\frac{V_0}{\sqrt{R^2 + (L\omega)^2}}\; e^{i(\omega t - \phi)}\right) = \frac{V_0}{\sqrt{R^2 + (L\omega)^2}}\; \cos(\omega t - \phi)$$