

SCI 113 Spring 2008

Answers exercises LN chapter 2, and book Chapter 6

- (1) LN 3.53: (a) $\sqrt{2}e^{i\pi/4}$, (b) $2e^{i\pi/3}$, (c) $3e^{i\pi}$, (d) $4e^{i\pi/2}$, (e) $2e^{-i\pi/6}$, (f) $\sqrt{2}e^{-i3\pi/4}$.
- (2) LN 3.54: (a) -1 , (b) $\frac{-1}{2} + i\frac{\sqrt{3}}{2}$, (c) $\frac{3\sqrt{2}}{2} + i\frac{3\sqrt{2}}{2}$, (d) $\frac{\pi}{2} - i\frac{\pi\sqrt{3}}{2}$, (e) $\frac{1}{2} + i\frac{\sqrt{3}}{2}$,
 (f) $-2i$, (g) -1 , (h) $\frac{-\sqrt{2}}{2} + i\frac{\sqrt{2}}{2}$.
- (3) exercise book 6.11: (b) $2e^{i\pi}$, (c) $3r^{-i\pi/2}$, (f) $\frac{\sqrt{2}}{1+\sqrt{3}}e^{-i\pi/4}$, (h) $\sqrt{2}e^{i(2+\pi/4)}$.
- (4) exercise book 6.16: (a) $z = i2n\pi$, $n \in \mathbb{Z}$, (c) $z = i(2n+1)\pi$, $n \in \mathbb{Z}$.
- (5) exercise book 6.23: (a) $\operatorname{Re}(z^2) = x^2 - y^2$ and $\operatorname{Im}(z^2) = 2xy$,
 (b) $\operatorname{Re}(z+2z^2+3z^3) = x+2x^2-2y^2+3x^3-9xy^2$ and $\operatorname{Im}(z+2z^2+3z^3) = y+4xy+9x^2y-3y^3$,
 (d) $\operatorname{Re}(\cos z) = \cos x \cosh y$ and $\operatorname{Im}(\cos z) = -\sin x \sinh y$.
- (6) exercise book 6.25: the image of the circle $|z| = 1$ is the ellipse whose equation is

$$\frac{u^2}{(1+c)^2} + \frac{v^2}{(1-c)^2}.$$