p409

1. $(2\,\text{cis}\,45°)^2 = 2^2\,\text{cis}\,2(45°) = 4\,\text{cis}\,90°$

2. $(2\,\text{cis}\,45°)^3 = 2^3\,\text{cis}\,3(45°) = 8\,\text{cis}\,135°$

3 $(\sqrt{2}\,\text{cis}(-18°))^4 = (\sqrt{2})^4\,\text{cis}\,4(-18°) = 4\,\text{cis}(-72°)$ $+360°$

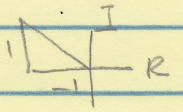
$4\,\text{cis}\,288°$

4. $(1\,\text{cis}\,36°)^{10} = 1^{10}\,\text{cis}\,10.36° = 1\,\text{cis}\,360°$

5 $(4\,\text{cis}\,\frac{\pi}{6})^3 = 4^3\,\text{cis}\,3(\frac{\pi}{6}) = 64\,\text{cis}\,\frac{\pi}{2}$

6 $(\sqrt{3}\,\text{cis}\,\frac{5\pi}{6})^6 = (\sqrt{3})^6\,\text{cis}(6\cdot\frac{5\pi}{6}) = 27\,\text{cis}\,5\pi$

7 $-1+i$



$r = \sqrt{1+1} = \sqrt{2}$

$\theta = 180° - \tan^{-1}(\frac{1}{1}) = 135°$

$z = \sqrt{2}\,\text{cis}\,135°$

$z^6 = (\sqrt{2}\,\text{cis}\,135°)^6$

$= (\sqrt{2})^6\,\text{cis}\,6(135°)$

$= 8\,\text{cis}\,810°$

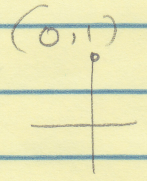
$= 8\,\text{cis}\,(810° - 2\cdot360°) =$

$8\,\text{cis}\,90°$

$= 8(\cos 90° + i\sin 90°)$

$= 8(0) + 8i(1)$

$= 8i$



p410

5 $(1-i\sqrt{3})^3$

$(1-i\sqrt{3})(1-i\sqrt{3})(1-i\sqrt{3})$

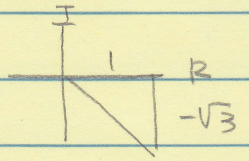
$(1-i\sqrt{3}-i\sqrt{3}+3i^2)(1-i\sqrt{3})$

$(1-2i\sqrt{3}-3)(1-i\sqrt{3})$

$(-2-2i\sqrt{3})(1-i\sqrt{3}) = -2+2i\sqrt{3}-2i\sqrt{3}+6i^2$

$= -2-6 = -8$

$1-i\sqrt{3}$



$r = \sqrt{1+3} = 2$

$\theta = 360° - \tan^{-1}\left(\frac{\sqrt{3}}{1}\right)$

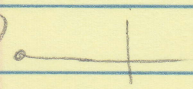
$= 360° - 60° = 300°$

$(2\,\mathrm{cis}\,300°)^3 = 2^3\,\mathrm{cis}\,3(300°)$

$= 8\,\mathrm{cis}\,900°$

$= 8\,\mathrm{cis}\,(900°-720°) = 8\,\mathrm{cis}\,180°$

$(-1,0)$



$= 8(\cos 180° + i \sin 180°)$

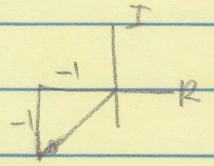
$= 8(-1) + 8i(0)$

$= -8$

6 $(-1-i)(-1-i)(-1-i)$

$(1+i+i+i^2)(-1-i) = (1+2i-1)(-1-i)$

$= (+2i)(-1-i) = -2i-2i^2 = 2-2i$



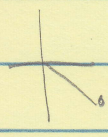
$r = \sqrt{1+1} = \sqrt{2}$

$\theta = 180° + \tan^{-1}\left(\frac{1}{1}\right) = 225°$

$(\sqrt{2}\,\mathrm{cis}\,225°)^3 = (\sqrt{2})^3\,\mathrm{cis}\,3(225°)$

$2\sqrt{2}\,\mathrm{cis}\,(675°) = 2\sqrt{2}\,\mathrm{cis}\,(675°-360°) = 2\sqrt{2}\,\mathrm{cis}\,31$

$2\sqrt{2}(\cos 315° + i \sin 315°)$



$2\sqrt{2}\left(\frac{\sqrt{2}}{2} + i\left(-\frac{\sqrt{2}}{2}\right)\right)$

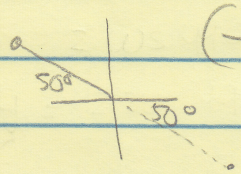
$2-2i$

p400

2. $(2, 490°) = (2, 490° - 360°) = (2, 130°)$

$(-2, 130° + 180°) = (-2, 310°)$

$(-2, 310°) = (-2, 310° - 360°) = (-2, -50°)$



4. $(0, 6)$ $r = 6$; $\theta = 90°$

$(6, 90°)$ not cis!!!

6. $(0, -4)$ $r = 4$ $\theta = \frac{3\pi}{2} \rightarrow (4, \frac{3\pi}{2})$ not cis

8. $(10, -\frac{3\pi}{2}) = (10, -\frac{3\pi}{2} + 2\pi) = (10, \frac{\pi}{2})$

$x = 10\cos\frac{\pi}{2} = 10(0) = 0$

$y = 10\sin\frac{\pi}{2} = 10(1) = 10$ $\rightarrow (0, 10)$