② Ex $\dfrac{(4-3i)^5(1-i)^3}{(5\sqrt{3}+5i)^3}$ $\quad (r\,\text{cis}\,\theta)^n = r^n\,\text{cis}\,n\theta$

$a=4 \quad b=-3 \quad (\text{Quad } 4)$

$r=\sqrt{16+9}$ $\quad \alpha=\tan^{-1}\left(\frac{3}{4}\right)$ $\quad \theta=360-36.9$ $\quad \boxed{5\,\text{cis}\,323.1^\circ}$

$r=\sqrt{25}$ $\quad \alpha=36.9^\circ$ $\quad \theta=323.1^\circ$

$r=5$

$a=1 \quad b=-1 \quad (\text{Quad } 4)$

$r=\sqrt{1+1}$ $\quad \alpha=\tan^{-1}\left(\frac{1}{1}\right)$ $\quad \theta=360-45$ $\quad \boxed{\sqrt{2}\,\text{cis}\,315^\circ}$

$r=\sqrt{2}$ $\quad \alpha=45^\circ$ $\quad \theta=315^\circ$

$a=5\sqrt{3} \quad b=5 \quad (\text{Quad } 1)$

$r=\sqrt{(5\sqrt{3})^2+(5)^2}$ $\quad \alpha=\tan^{-1}\left(\frac{5}{5\sqrt{3}}\right)$ $\quad \theta=30^\circ$ $\quad \boxed{10\,\text{cis}\,30^\circ}$

$r=\sqrt{75+25}$ $\quad \alpha=30^\circ$

$r=10$

$$\frac{(5\,\text{cis}\,323.1)^5(\sqrt{2}\,\text{cis}\,315)^3}{(10\,\text{cis}\,30)^3}$$

$$\frac{[5^5\,\text{cis}(5\cdot 323.1)][\sqrt{2}^3\,\text{cis}(3\cdot 315)]}{10^3\,\text{cis}(3\cdot 30)}$$

$$\frac{(3125\,\text{cis}\,1615.5)(2\sqrt{2}\,\text{cis}\,945)}{100\,\text{cis}\,60}$$

$$\frac{6250\sqrt{2}\,\text{cis}\,2560.5}{100\,\text{cis}\,60}$$

$$62.5\sqrt{2}\,\text{cis}\,2500.5$$

$$\boxed{62.5\sqrt{2}\,\text{cis}\,340.5^\circ}$$

① a) $(3-2i)^2-(2+i)(1-i)$

$(3-2i)(3-2i)-(2+i)(1-i)$

$9-12i+4i^2-(2-i-i^2)$

$9-12i-4-2+i+i^2$ → -1

$\boxed{2-11i}$

b) $2i^3-i^{12}+2i^{18}-(3i^3)^3$

$2i^3-i^{12}+2i^{18}-27i^9$

$2(-i)-1+2(i^{16})(i^2)-27(i^8)(i)$

$-2i-1-2-27i$

$\boxed{-3-29i}$

② a) $x^2+x+3=0$

$a=1$ $b=1$ $c=3$

$x=\frac{-(1)\pm\sqrt{(1)^2-4(1)(3)}}{2(1)}$

$x=\frac{-1\pm\sqrt{1-12}}{2}$

$x=\frac{-1\pm\sqrt{-11}}{2}$

$x=\frac{-1\pm i\sqrt{11}}{2}$

$\boxed{x=\frac{-1}{2}\pm\frac{i\sqrt{11}}{2}}$

② b) $x^2+2=2x$

$x^2-2x+2=0$

$a=1$ $b=-2$ $c=2$

$x=\frac{-(-2)\pm\sqrt{(-2)^2-4(1)(2)}}{2(1)}$

$x=\frac{2\pm\sqrt{4-8}}{2}$

$x=\frac{2\pm 2i}{2}$

$\boxed{x=1+i}$

Review #1

① b) $2i^3 - i^{13} + 2i^{18} - (3i^3)^3$

$2i^3 - i^{13} + 2i^{18} - 27i^9$

$2(-i) - (1) + 2(i^{16} \cdot i^2) - 27(i^8 \cdot i)$

$-2i - 1 + 2(-1) - 27(i)$

$-2i - 1 - 2 - 27i$

$\boxed{-3 - 29i}$

① c) $\dfrac{(1+i)(2-i)}{(-3+2i)}$

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

$\dfrac{(3+i)(-3-2i)}{(-3+2i)(-3-2i)}$

$\dfrac{-9 - 9i - 2(i^2)}{9 - 4(i^2)}$

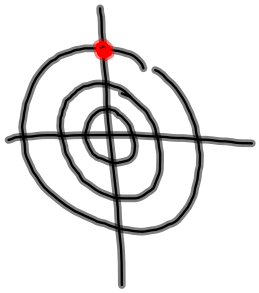
$\dfrac{-7-9i}{13} \rightarrow \left(\dfrac{-7}{13} - \dfrac{9i}{13}\right)$

④ b) $(-3, \frac{3\pi}{2})$

$r = -3$

$\theta = \frac{3\pi}{2}$

$(-3, 270°)$



Convert to Degrees

$\frac{3\pi}{2} \times \frac{180^{90}}{\pi} = 270°$

Review #2 $(r\text{cis}\theta)^n = r^n\text{cis}n\theta$

① c) $(1+i)^{11}(1-i)^{15}$ ($a=1, b=1$; $a=1, b=-1$)

① $r=\sqrt{(1)^2+(1)^2}$ ② $\alpha=\tan^{-1}\left(\frac{1}{1}\right)$ ③ Quad I ④ $\sqrt{2}\text{cis}45°$

$r=\sqrt{2}$ $\alpha=45°$ $\theta=\alpha$ $\theta=45°$

① $r=\sqrt{(1)^2+(-1)^2}$ ② $\alpha=\tan^{-1}\left(\frac{1}{1}\right)$ ③ Quad 4 ④ $\sqrt{2}\text{cis}315°$

$r=\sqrt{2}$ $\alpha=45°$ $\theta=360°-45°$ $\theta=315°$

$(\sqrt{2}\text{cis}45)^{11}(\sqrt{2}\text{cis}315)^{15}$

$(\sqrt{2}^{11}\text{cis}(11\cdot45))(\sqrt{2}^{15}\text{cis}(15\cdot315))$

$(32\sqrt{2}\text{cis}495)(128\sqrt{2}\text{cis}4725)$

$(4096(2)\text{cis}5220)$

$8192\text{cis}180°$ Polar

$-8192+0i$ Rectangular

Polar → Rectangular

$r\text{cis}\theta$ $a+bi$

① $a=r\cos\theta$ ② $b=r\sin\theta$ ③ $a+bi$

1) a) $\boxed{3125\,\text{cis}\,360^\circ}$ polar form

$a = 3125\cos 360$ $\quad b = 3125\sin 360$ $\quad 3125 + 0i$

$a = 3125(1)$ $\quad b = 3125(0)$ $\quad \boxed{3125}$

$a = 3125$ $\quad b = 0$

rectangular form

① b) $(1-i)^{10}$ $a=1$ $b=-1$ $(r\text{cis}\theta)^n = r^n\text{cis}n\theta$

① $r=\sqrt{(1)^2+(-1)^2}$ ② $\alpha=\tan^{-1}\left(\frac{1}{1}\right)$ ③ Quad 4 ④ $\sqrt{2}\,\text{cis}315$

$r=\sqrt{2}$ $\alpha=45^\circ$ $\theta=360-45^\circ$

$\theta=315$

$(\sqrt{2}\,\text{cis}315)^{10}$

$\sqrt{2}^{10}\,\text{cis}(10\cdot315)$

$32\,\text{cis}3150$

$32\,\text{cis}270^\circ$ Polar

$0-32i$ Rectangular

① e) $\dfrac{(1+i)^2(1-i\sqrt{3})^3}{(5\sqrt{3}+5i)^2}$

① $r=\sqrt{(1)^2+(1)^2}$ ② $\alpha=\tan^{-1}\left(\frac{1}{1}\right)$ ③ Quad I ④ $\sqrt{2}\,\text{cis}\,45°$

$r=\sqrt{2}$ $\alpha=45°$ $\theta=45°$

$r=\sqrt{2}$

① $r=\sqrt{(1)^2+(-\sqrt{3})^2}$ ② $\alpha=\tan^{-1}\left(\frac{\sqrt{3}}{1}\right)$ ③ Quad 4 ④ $2\,\text{cis}\,300°$

$r=\sqrt{4}$ $\alpha=60°$ $\theta=360°-60°$

$r=2$ $\theta=300°$

① $r=\sqrt{(5\sqrt{3})^2+(5)^2}$ ② $\alpha=\tan^{-1}\left(\frac{5}{5\sqrt{3}}\right)$ ③ Quad I ④ $10\,\text{cis}\,30°$

$r=\sqrt{75+25}$ $\alpha=30°$ $\theta=30°$

$r=10$

$$\frac{(\sqrt{2}\,\text{cis}\,45°)^2(2\,\text{cis}\,300°)^3}{(10\,\text{cis}\,30°)^2}$$

$$\frac{[\sqrt{2}^2\,\text{cis}(2\cdot45°)][2^3\,\text{cis}(3\cdot300°)]}{[10^2\,\text{cis}(2\cdot30°)]}$$

$$\frac{(2\,\text{cis}\,90°)(8\,\text{cis}\,900°)}{100\,\text{cis}\,60°}$$

$$\frac{16\,\text{cis}\,990°}{100\,\text{cis}\,60°}$$

$$0.16\,\text{cis}\,930°$$

$$\boxed{0.16\,\text{cis}\,210°}$$ Polar Form