Complex numbers - trigonometric form and roots

2.1 Write numbers in trigonometric form:

a) $7 + 7i$ **b)** $\sqrt{3} - i$ **c)** $-5 + 5\sqrt{3}i$ **d)** $-\sqrt{3} - i\sqrt{3}$

2.2 Draw sets of complex numbers which satisfy conditions:

a) $\arg z = \frac{5}{4}\pi$

b) $\frac{\pi}{6} < \arg(z + 3i) < \frac{\pi}{3}$

c) $\pi \leqslant \arg(iz) < 2\pi$

d) $\operatorname{Im}(z^4) \geqslant 0$

e) $\operatorname{Re}(iz^6) = 0$

f) $\operatorname{agr} \dfrac{z+1}{i} = \frac{3}{2}\pi$

g) $z^6 + 2i|z^6| = (\overline{z})^6$

2.3 Calculate and write the result in algebraic form:

a) $(1 - i)^{12}$ **b)** $(1 + i\sqrt{3})^8$ **c)** $(2\sqrt{3} - 2i)^{30}$

d) $\left(\cos\frac{\pi}{4} - i\sin\frac{\pi}{4}\right)^{10}$ **e)** $\dfrac{(1+i)^{22}}{1 - i\sqrt{3})^6}$ **f)** $\left(\sin\frac{\pi}{6} + i\cos\frac{\pi}{6}\right)^{24}$

2.4 Calculate roots:

a) $\sqrt{-1 + i\sqrt{3}}$ **b)** $\sqrt[3]{-27}$ **c)** $\sqrt[4]{-4}$

d) $\sqrt[5]{32i}$ **e)** $\sqrt[3]{(2-i)^6}$ **f)** $\sqrt[3]{(2-2i)^9}$