Tutorial Worksheet No.4

Exercise 1.

a) Solve in $\mathbb{C}$ the following equations :

1. $2z^2 + \sqrt{2}z + 2 = 0$

2. $\alpha z + 2\sqrt{\alpha}z = -i \qquad \alpha \in \mathbb{R}$

b) Simplify the following :

1. $\dfrac{1+i}{1-i} - (1+2i)(2+2i) + \dfrac{3-i}{1+i}$

2. $2i(i-1) + \left(\sqrt{3}+i\right)^3 + (1+i)(\overline{1+2i})$

Exercise 2.

1. Find $z \in \mathbb{C}$ such that
$$z\overline{z} = i(z-1) + 1$$

2. Find $z \in \mathbb{C}$ such that $z^2 - i \in \mathbb{R}$

3. Write in algebraic form $z = (3+3i)^8$

4. Write in trigonometric form the following :

   (a) $\left(\cos(\dfrac{\pi}{3}) + i\sin(\dfrac{\pi}{3})\right)^7$

   (b) $6i$

Exercise 3.

1. Write in the polar and exponetial polar forms :
$$w = \dfrac{-1}{2+2i}$$

2. Calculate $Im((i+1)^8 z^2)$ for $z = x + iy$.