1. Find real and imaginary part the following
(a) $(4-2 i)^{3}$
(b) $\frac{3-2 i}{6-5 i}$
(c) $(3+2 i)^{2}$
(d) $5 e^{i \pi / 3}$
(e) $(1+i)^{n}, n=1,2,3, \ldots$
2. Find polar representation (a) $-7 i$; (b) -6 ; (c) $-2+2 i$; (d) $1+\sqrt{3} i$; (e) 5 ;
3. Find complex square roots of each of the complex number in the previous exersice.
4. For a given function $L(z)$ the orbit of a point z is the set $\{z, L(z), L(L(z)), L(L(L(z))), \ldots$. Let $L_{a}(z)=a z$; Sketch the orbit of 1 in the plane for each of the following values $a$
(a) $a=i / 2$
(b) $a=2 i$
(c) $a=1+\sqrt{3} i$
(d) $a=i$
(e) $a=e^{2 \pi i / 9}$
5. Sketch a curve in the complex plane given by equation
(a) $|z-1+i|=3$
(b) $|z-1+i|=|z+2|$
(c) $z^{2}-\bar{z}^{2}=3 i$
6. Solve
(a) $z^{5}=-i$
(b) $z^{4}+2 z^{2}+1=-1$
7. Extra Points Problem 1. Sketch a curve(s) which consists of square roots of all points that lie on a circle in the complex plane.

Hint: consider 4 cases: circle centered at the origin; origin lies inside the circle; origin lies on the circle; origin lies outside the circle.
8. Extra Points Problem 2. Prove Lagrange's trigonometric identity

$$
1+\cos x+\cos (2 x)+\ldots .+\cos (n x)=\frac{1}{2}+\frac{\sin ((n+1 / 2) x)}{2 \sin (x / 2)}
$$

