Complex numbers

1.1 Calculate:

a) $(1-3i)+(4-i)$ **b)** $(1+2i)-(3-6i)$ **c)** $(1-i)(6+5i)$

d) $\dfrac{2+3i}{1-i}$ **e)** $(1+3i)(1-3i)$ **f)** $(2+i)^2$

g) $(\sqrt{3}-i)^3$ **h)** $\dfrac{1}{2-i}$ **i)** $\dfrac{1}{(1-2i)^2}$

1.2 Find real numbers x and y that satisfy equations:

a) $x(2+3i)+y(5-2i)=-8+7i$

b) $(2+yi)\cdot(x-3i)=7-i$

c) $\dfrac{1+yi}{x-2i}=3i-1$

d) $\dfrac{x+yi}{x-yi}=\dfrac{9-2i}{9+2i}$

1.3 Solve equations:

a) $z^2=4\overline{z}$

b) $\dfrac{1+i}{z}=\dfrac{2-3i}{\overline{z}}$

c) $2z+\overline{z}=6-5i$

d) $(z+2)^2=(\overline{z}+2)^2$

1.4 Calculate modulus of complex numbers:

a) $4i$ **b)** $12i-5$ **c)** $(4i+3)(\sqrt{2}-i)$

d) $\dfrac{2-i}{\sqrt{3}i-1}$ **e)** $\overline{\sqrt{5}+2i}$ **f)** $(1-\sqrt{2}i)^4$

1.5 Draw sets of numbers on complex plane:

a) $\mathrm{Re}(iz+2)\geqslant 0$ **b)** $\mathrm{Im}\ z^2<0$

c) $\overline{z-i}=z-1$ **d)** $\dfrac{4}{z}=\overline{z}$

e) $|z-3+4i|=1$ **f)** $\left|\dfrac{z-2i}{z+1}\right|=1$

g) $2\leqslant|iz-5|<3$ **h)** $|z+1-2i|\geqslant 3$ and $|z-3|<4$

i) $\left|\dfrac{z+i}{z^2+1}\right|\geqslant 1$