TUTORIAL 1. COMPLEX NUMBERS 1

1.1. Show that multiplication of complex numbers is associative

1.2. Show that multiplication of complex numbers is distributive with respect to addition.

1.3. Calculate

(a) (2+3i)(4-2i) (b) (1+2i)(2i-1) (c) (3+i)(3-i) (d) (a+bi)(a-bi)

1.4. Calculate

(a) $\frac{2-3i}{3+4i}$ (b) $\frac{i}{1+i}$ (c) $\frac{3-4i}{i}$

1.5. Calculate

(a) $\left|\frac{1+4i}{4-i}\right|$ (b) $\left|\frac{z}{\bar{z}}\right|$ (c) $\left|\frac{(3+4i)^4}{(3-4i)^3}\right|$

1.6. Show that for every two complex numbers z and w, $|zw|=|z||w|$

1.7. Find polar forms for the following complex numbers

(a) $3+(3\sqrt{3})i$

(b) i-1

(c) -3 (negative 3)

(d) -z, if $z=\cos\alpha+i\sin\alpha$

(e) $2+2i$

(f) $\sin\alpha+i\cos\alpha$

(g) $1-i\sqrt{3}$

(h) 1

(i) $\bar{z}$, if $z=\cos\alpha+i\sin\alpha$

(j) -i

(k)

(l)