$$= \frac{(2-3)+(-6-1)i}{3-2i} = \frac{-1-7i}{3-2i}$$

(3)

$$= \frac{-1-7i}{3-2i} \times \frac{3+2i}{3+2i} = \frac{(-1-7i)(3+2i)}{(3^2)-(2i)^2} = \frac{(-3+14)+(-2-21)i}{9+4}$$

$$= \frac{11}{13} - \frac{23}{13}i$$

Simplify by expressing in the form of $a+bi$

$5+4i$

$3+5\sqrt{3}i$

Q8

(i) $5+2\sqrt{-4}$

(ii) $\frac{2}{\sqrt{5}+\sqrt{-8}}$

$= 5+2\sqrt{(-1)(4)} = 5+2\sqrt{-1}\sqrt{4} = 5+2(2)i$

$= 5+4i$

$$\frac{2}{\sqrt{5}+\sqrt{-8}} = \frac{2}{\sqrt{5}+\sqrt{-1}\sqrt{2\times4}} = \frac{2}{\sqrt{5}+2\sqrt{2}i}$$ rationaliz

$$\frac{2}{\sqrt{5}+2\sqrt{2}i} \times \frac{\sqrt{5}-2\sqrt{2}i}{\sqrt{5}-2\sqrt{2}i} = \frac{2\sqrt{5}-4\sqrt{2}i}{(\sqrt{5})^2-(2\sqrt{2})^2(i)^2} = \frac{2\sqrt{5}-4\sqrt{2}i}{5+8}$$

$$= \frac{2\sqrt{5}}{13} - \frac{4\sqrt{2}}{13}i$$

Q Simplify: $\left(-\frac{1}{2}+\frac{\sqrt{3}}{2}i\right)^3$, $(2+\sqrt{-3})(3+\sqrt{-3})$, $\frac{3}{\sqrt{6}-\sqrt{-12}}$

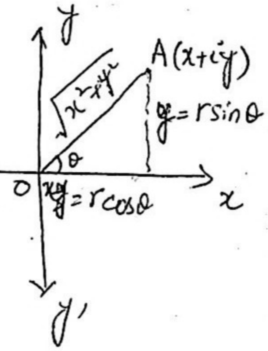
(v) $\left(-\frac{1}{2}-\frac{\sqrt{3}}{2}i\right)^{-2}\left(-\frac{1}{2}-\frac{\sqrt{3}}{2}i\right)$ (ii) $\left[-\frac{1}{2}-\frac{\sqrt{3}}{2}i\right]^3$ (iii) $(a+bi)^2$

(vi) $(3-\sqrt{-4})^{-3}$ (iv) $(a+bi)^3$ (vi) $(a-bi)^3$

Polar / De Moivre's Theorem.

Polar form of Complex Numbers :-

$Z = x+iy$ From diagram we see that $x = r\cos\theta$, $y = r\sin\theta$ where $r = |Z|$ and θ is called argument of Z



$$x+iy = r\cos\theta + ir\sin\theta \rightarrow (1)$$

where $r = \sqrt{x^2+y^2}$ and $\theta = \tan^{-1}\frac{y}{x}$

Eq (1) is called Polar form of complex Number Z.