

6. Find each of the following, expressing your answer in algebraic form.

$$\text{i) } \frac{(1 + \sqrt{3}i)^4}{(1 - \sqrt{3}i)^5}$$

$$\text{ii) } \frac{(i - 1)^3}{(2\sqrt{3} - 2i)^5}$$

$$\text{i) } (1+i\sqrt{3})^4/(1-i\sqrt{3})^5=(1+i\sqrt{3})^4/(1-i\sqrt{3})^5$$

$$(1+i\sqrt{3})^4=(1+3)^4(\cos(4P/3)+i\sin(4P/3))=4^4(\cos(4P/3)+i\sin(4P/3))=4^4(-\frac{1}{2}-i\sqrt{3}/2)$$

$$(1-i\sqrt{3})^5=4^5(\cos(-5P/3)+i\sin(-5P/3))=4^5(\cos(P/3)+i\sin(P/3))=4^5(1/2+i\sqrt{3}/2)$$

$$4^4(-\frac{1}{2}-i\sqrt{3}/2)/4^5(1/2+i\sqrt{3}/2)=(-\frac{1}{2}-i\sqrt{3}/2)/4(1/2+i\sqrt{3}/2)=-\frac{1}{4}$$