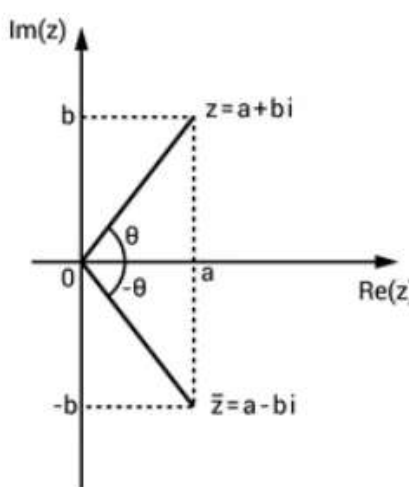




INDIAN SCHOOL AL WADI AL KABIR
Class XI, Mathematics
COMPLEX NUMBERS WORKSHEET(DTQ)

Questions of 2 marks each	
Q.1.	Find the multiplicative inverse of $-1 - 2i$
Q.2.	What is the value of $(\sqrt{2} + 3i)(\sqrt{2} - 3i)$?
Q.3.	Find the conjugate of $1 + i + i^2 + i^4 + i^6$.
Q.4.	Express $\frac{5 + \sqrt{2}i}{1 - \sqrt{2}i}$ in the form $a + ib$
Questions of 3 marks each	
Q.5.	If $x + iy = \sqrt{\frac{a + ib}{c + id}}$, prove that $(x^2 + y^2)^2 = \frac{a^2 + b^2}{c^2 + d^2}$
Q.6.	Find the magnitude and conjugate of the number $\left(\frac{1}{1-i}\right)\left(\frac{1+i}{2}\right)$
Q.7.	Write $(\sqrt{3} + i)(1 + \sqrt{3}i)$ in the form $a + ib$.
Q.8.	Express $\frac{2 - \sqrt{-25}}{1 - \sqrt{-16}}$ in the form $a + ib$. Also, find its conjugate.
Q.9.	Find the value of x and y if $(x + iy)(2 - 3i) = 4 + i$
Questions of 5 marks each	
Q.10.	Express $\frac{\sqrt{5 + 12i} + \sqrt{5 - 12i}}{\sqrt{5 + 12i} - \sqrt{5 - 12i}}$ in the form $a + ib$. and hence find the modulus
Q.11.	Find real θ such that $\frac{3 + 2i \sin \theta}{1 - 2i \sin \theta}$ is purely real
Q.12.	If $(x + iy)^3 = a + ib$, then show that $\frac{a}{x} + \frac{b}{y} = 4(x^2 - y^2)$
Q.13.	(a) Express $\frac{3 - i}{5 + 6i}$ in the form $(a + ib)$. b) Express $i^{15} - 3i^7 + 2i^{109} + i^{100} - i^{17} + 5i^3$. in the form $(a + ib)$.

Q.14.	CASE STUDY QUESTION: A conjugate of a complex number is another complex number that has the same real part as the original complex number, and the imaginary part has the same magnitude but opposite sign. If we multiply a complex number with its conjugate, we get a real number. A complex number z is purely real if and only if $\bar{z} = z$ and is purely imaginary if and only if $\bar{z} = -z$. Based on the above information, answer the following questions. (a) Find the conjugate of $(2 + i)^2$ (b) Find the multiplicative inverse of $(4 - 3i)$. (c) Express $(3 + 4i)(6 - 3i)(5 + i)$ in the form $(a + ib)$.	
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ANSWERS						
Q.1.	$-\frac{1}{5} + \frac{2}{5}i$	Q.2.	11	Q.3.	-i	
Q.4.	$1 + 2\sqrt{2}i$	Q.5.	Proof			
Q.6.	$\bar{z} = -\frac{1}{2}i, z = \frac{1}{2}$			Q.7.	4i	
Q.8.	$\frac{22}{17} - \frac{3}{17}i$, Conjugate: $\frac{22}{17} + \frac{3}{17}i$,			Q.9.	$x = \frac{5}{13}, y = \frac{14}{13}$	
Q.10.	$\frac{5}{12} + \frac{\sqrt{119}}{12}i$ $ z = 1$	Q.11.	$\theta = n\pi, n \in \mathbb{N}$		Q.12	proof
Q.13.	(a) $\frac{9}{61} - \frac{23}{61}i$ (b) $1 - 2i$	Q.14	(a) $3 - 4i$ (b) $\frac{4}{25} + \frac{3}{25}i$ (c) $135 + 105i$			
