



# INDIAN SCHOOL AL WADI AL KABIR

Dept. of Mathematics 2019 - 2020, Class - XI

Work Sheet - Complex Numbers - 2, TERM - 1

DATE: 25-08-2021

## Long Answer Type Questions

|    |                                                                                                     |
|----|-----------------------------------------------------------------------------------------------------|
| 1. | If $x + iy = \sqrt{\frac{1+i}{1-i}}$ ; prove that $x^2 + y^2 = 1$                                   |
| 2. | Prove that $a^2 + b^2 = 1$ and $\frac{b}{a} = \frac{2c}{c^2 - 1}$ if $a + ib = \frac{c+i}{c-i}$ .   |
| 3. | Find real value of $\theta$ such that, $\frac{1+i \cos \theta}{1-2i \cos \theta}$ is a real number. |
| 4. | Find real $\pi$ such that $\frac{3+2i \sin \theta}{1-2i \sin \theta}$ is purely real.               |
| 5. | For complex numbers $z_1 = 6+3i$ and $z_2 = 3-i$ , find $\frac{z_1}{z_2}$                           |
| 6. | If $\frac{(a^2+1)^2}{2a-i} = x+iy$ , then what is the value of $x^2 + y^2$ ?                        |
| 7. | What is the conjugate of $\frac{2-i}{(1-2i)^2}$ ?                                                   |

## Answers

|                                         |                                         |                                  |  |
|-----------------------------------------|-----------------------------------------|----------------------------------|--|
| Q3                                      | Q4                                      | Q5                               |  |
| $\theta = (2n+1)\frac{\pi}{2}, n \in Z$ | $\theta = n\pi$                         | $\frac{3}{2}(1+i)$               |  |
|                                         | Q9                                      | Q10                              |  |
|                                         | $\frac{(a^2+1)^4}{4a^2+1} = x^2 + y^2.$ | $\bar{z} = \frac{1}{25}(-2-11i)$ |  |