11th NCERT + 12th (More)

Basic + Log
Trigo-1
Trigo-2
B.T
QE
S&P
STL
Circle
PnC
SOT

C.N → 9 Days	4L	5L
C.S. → 16 Days	8D	8D
Prob → 9 Day	4L	5L
Fxn + Rel.	3D	+ 15D
Limit + MOD.	2D +	9D
Statistic	1D.	
		12th

Revise + Full

NCERT + NCERT Exampler.

B + L → 9
Trigo - 2
B.T. → 2
QE → 2

Jan + Feb

School ka Achha

Revise Score

11th Paper.

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Complex No.

A No

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A) A No of the form $x+iy$ is called C.N.

where $x, y \in R$ & $i = \sqrt{-1}$

B) "i" is known as "iota"

It is Symbol of $\sqrt{-1}$

(C) $Z = \underbrace{-3}_{\text{Real Part}} + \underbrace{4i}_{\text{Img. Part}}$ is C.N.

$\left.\begin{matrix} x = -3 \\ y = 4 \end{matrix}\right\} \in$ Real No.

Every C.N $x+iy$ has 2 Parts

Real Part & imaginary Part

$Im(z) = 4$

$Re(Z) = -3$

Q Im(z) & Re(Z) of following

	Im(z)	Re(z)
$-2+5i$	5	-2
$-3-4i$	-4	-3
$\{0+2i\}$ $2i$	2	0
$\{4+0 \cdot i\}$ 4	0	4

(D) $Z = $ C.N $= x+iy$

Purely Real C.N.
$y = 0$
i का Part Nhi hoga
$Z = x$

Purely Img C.N
$x = 0$
Real Part $= 0$ होगा
$Z = iy$

Purely Real & Img C.N
$x = 0$ & $y = 0$
$Z = 0 + 0i$

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Q $Z = 2i$ is ..... C.N.

As $Z = 2i$

$= \underline{0} + 2i$

here Real Part $= 0$

$\Rightarrow$ it is Purely Img. C.N.

Q $Z = \sqrt{-9}$ is ..... C.N.?

$Z = \sqrt{9}\sqrt{-1} = 3i$

$Z = 0 + 3i$

Real Part $= 0 \Rightarrow$ It is Purely Img CN.

Q $Z = -3$ is __ CN.

$Z = -3 + 0 \cdot i$

$Y = 0 \Rightarrow$ Img. Part $= 0$

$\Rightarrow$ It is Purely Real C.N.

सारे Real No Complex No में आते?

yes all Real No. are Subset of C.N.

$$
\begin{array}{ccc}
 & CN & \\
\swarrow & & \searrow \\
R & & I
\end{array}
$$

$$\boxed{N \subset I \subset Q \subset R \subset Z}$$

Q

	$Re(z)$	$Im(z)$
(1) $1 + \sqrt{-2}$ $= 1 + \sqrt{2}\, i$	1	$\sqrt{2}$
2) $1 + \sqrt{2}$	$1 + \sqrt{2}$	0
3) $\sqrt{2}$	$\sqrt{2}$	0
4) $\sqrt{-1} + \sqrt{2}$	$\sqrt{2}$	1

$1 + \sqrt{2} = (1 + \sqrt{2}) + 0 \cdot i$

$\sqrt{2} = \sqrt{2} + 0 \cdot i$

$\sqrt{-1} + \sqrt{2} = \sqrt{2} + i$

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IOTA की Dunia

(1) $\sqrt{-2} = \sqrt{2}\, i$

$i^0 = 1$

(A) $i^1 = i$

$i^2 = \sqrt{-1} \times \sqrt{-1} = -1$

$i^3 = \sqrt{-1} \times \sqrt{-1} \times \sqrt{-1} = -1 \times i = -i$

$i^4 = \underbrace{\sqrt{-1} \times \sqrt{-1}}_{-1} \times \underbrace{\sqrt{-1} \times \sqrt{-1}}_{-1}$

$-1 \times -1 = 1$

$$\boxed{\begin{aligned} i^1 &= i \\ i^2 &= -1 \\ i^3 &= -i \\ i^4 &= 1 \end{aligned}}$$

$i^5 = i^4 \times i = i$

$i^6 = i^4 \times i^2 = 1 \times -1 = -1$

$i^7 = i^4 \times i^3 = 1 \times -i = -i$

$i^8 = i^4 \times i^4 = 1 \times 1 = 1$

Q $i^{27} = ?$

$i^{4 \times 6 + 3}$

$(i^4)^6 \times i^3$

$1^6 \times i^3$

$1 \times -i = -i$

Q i^{98}

$i^{4 \times 24 + 2}$

$(i^4)^{24} \times i^2$

$(1)^{24} \times (-1)$

$1 \times -1 = -1$

Q $i^{2002} = ?$

$i^{4 \times 500 + 2}$

$(i^4)^{500} \times i^2 = 1 \times -1 = -1$

Q $i^{4n} = ?$ $\quad n \in N$

$(i^4)^n = (1)^n = 1$

Q $i^{4n+1} = ?$

$i^{4n} \cdot i = (i^4)^n \cdot i = (1)^n \cdot i = 1 \times i$

$= i$ A

Q $i^{4n+2} = ?$

$i^{4n} \times i^2 = (i^4)^n \times i^2 = (1)^n \times -1 = 1 \times -1$

$= -1$

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Q $i^{4n+3} = ?$

$i^{4n} \times i^3 = (i^4)^n \times (-i)$

$= (1)^n \times -i = -i$

$$\boxed{\begin{aligned} i^{4n} &= 1 \\ i^{4n+1} &= i \\ i^{4n+2} &= -1 \\ i^{4n+3} &= -i \end{aligned}}$$

RK: Sum of any 4 Consecutive Powers of iota = 0 always.

$i^{13} + i^{14} + i^{15} + i^{16} = 0$

$i \quad -1 \quad -i \quad +1 = 0$

$i^{13} = i^{4\times3+1} = i$

$i^{14} = i^{4\times3+2} = -1$

$i^{15} = i^{4\times3+3} = -i$

$i^{16} = i^{4\times4} = 1$

Sum $= 0$

Q $i^{200} + i^{201} + i^{202} + i^{203} = ?$

$i^{4\times50} + i^{4\times50+1} + i^{4\times50+2} + i^{4\times50+3}$

$1 + \cancel{(i)} + -1 + \cancel{(-i)}$

$= 0$

Q If $K \in N$ then

$\dfrac{i^{4K+1} - i^{4K-1}}{2} = ?$

(M1) $K \in N$: $K = 1$

Expression $= \dfrac{i^5 - i^3}{2}$

$= \dfrac{i^4 \times i - (-i)}{2}$

$= \dfrac{i + i}{2} = i$

(M2) Exp $= \dfrac{i^{4K+1} - i^{4K+3}}{2}$

$= \dfrac{i - (-i)}{2} = \dfrac{2i}{2} = i$

$i^{4K-1} = i^{4K+3}$

$i^{4K-2} = i^{4K+2}$

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M3 $\dfrac{i^{4K+1} - i^{4K-1}}{2}$

$\dfrac{(i^4)^K \cdot i - (i^4)^K \cdot i^{-1}}{2}$

$\dfrac{1 \cdot i - 1 \cdot (i)^{-1}}{2}$

$\dfrac{i - \frac{1}{i}}{2}$

$= \dfrac{i - (-i)}{2}$

$= \dfrac{2i}{2} = i$

i ko niche rkhna Psnd nhi

$\dfrac{1}{i} \times \dfrac{-i}{-i}$ ((Conjugate se Multiply))

$= \dfrac{-i}{-i^2} = \dfrac{-i}{+(+1)}$

$= -i$

Q $Z = \dfrac{1}{3+4i}$ then $Re(z)$ & $Im(z)$?

$Z = \dfrac{1}{3+4i} \times \dfrac{3-4i}{3-4i}$

$= \dfrac{3-4i}{(3)^2 - (4i)^2}$

$= \dfrac{3-4i}{9 - 16 \times i^2}$

$= \dfrac{3-4i}{9+16 \times 1} = \dfrac{3-4i}{25} = \dfrac{3}{25} - \dfrac{4i}{25}$

$Re(Z) = \dfrac{3}{25}$ | $Im(z) = \dfrac{-4}{25}$

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Q $Z = \frac{1}{1-i}$ then $Re(z)/Im(z)$?

$$Z = \frac{1}{1-i} \times \frac{1+i}{1+i}$$

$$= \frac{1+i}{(1)^2-(i)^2}$$

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

$$= \frac{1}{2} + \frac{i}{2}$$

$Re(z) = \frac{1}{2}$, $Im(z) = \frac{1}{2}$

Q $\sum_{n=1}^{100} i^n = ?$ $n \in N$

$= 0$

25 set of 4 Consecutive Powers of Iota.

Q $\sum_{K=1}^{11} i^k + i^{K+1} = ?$

$$\Rightarrow \sum_{K=1}^{11} i^K(1+i)$$

Without K constant ki tarah

$$(1+i)\sum_{K=1}^{11} i^K = (1+i)\{\underbrace{i+i^2+i^3+i^4}_{0}+\underbrace{i^5 \cdots + i^8}_{0}+i^9+i^{10}+i^{11}\}$$

$$= (1+i)\{i+i^2+i^3\} = (1+i)\{\cancel{i}+-1+-\cancel{i}\}$$

$$= -1-i$$

M2 $\sum_{i=1}^{11} i^K + \sum_{K=1}^{11} i^{K+1}$

$$= \{\underbrace{i+i^2+i^3+i^4}_{0}+\underbrace{\cdots i^8}_{0}+i^9+i^{10}+i^{11}\}$$

$$+\{\underbrace{i^2+i^3+i^4+i^5}_{0}+\underbrace{i^6+ \cdots +i^9}_{0}+i^{10}+i^{11}+i^{12}\}$$

$$= \{i+i^2+i^3\}+\{i^2+i^3+1\}$$

$$= \{\cancel{i}+-1-\cancel{i}\}+\{-\cancel{1}-i+\cancel{1}\}$$

$$= -1-i \text{ Ans}$$

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Q $1+i^2+i^4+i^6+i^8+\dots+i^{2n}=?$

$i^0+i^2+i^4+i^6+i^8+\dots+i^{2n}$

1) $\longleftarrow (n+1)\text{terms} \longrightarrow$

2) GP.

3) $S_n=\frac{a(1-r^n)}{1-r}$ / $\boxed{\frac{a-l\times r}{1-r}}$

$1+\underbrace{i^2}_{i^2}+\underbrace{i^4}_{i^2}+\underbrace{i^6}_{i^2}+\underbrace{i^8}_{i^2}\dots i^{2n}$

$r=i^2$

$S_{n+1}=\frac{1-i^{2n}\times i^2}{1-i^2}$

$=\frac{1+i^{2n}}{1-(-1)}$

$=\frac{1+i^{2n}}{2}=\begin{cases}\frac{1+(-1)}{2}=0 & n=\text{odd}\\ \frac{1+1}{2}=1 & n=\text{even}\end{cases}$

Q $\prod_{K=1}^{100} i^K=?$

$i^1\times i^2\times i^3\times i^4\times\dots\times i^{100}$

$=(i)^{1+2+3+\dots+100}$

5050

$=(i)$

$=(i)^{4\times1262+2}$

$=i^2=-1$

Q $S=i+2i^2+3i^3+4i^4+\dots-100\text{terms}?$

$S=\underbrace{i-2+3(-i)+4(1)}+5i-6-7i+8$

$=(2-2i)+(2-2i)\dots$

$=25\times(2-2i)$

$=50(1-i)$ Ans

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Q If $z = \cos\theta + i(2\sin\theta - 1)$ is Purely Real then $\theta = ?$

$\operatorname{Im}(z) = 0$

$2\sin\theta - 1 = 0$

$\sin\theta = \frac{1}{2}$

$\theta = \frac{\pi}{6}$

$$\boxed{\theta = n\pi + (-1)^n \frac{\pi}{6}}$$

Q If $z + z^3 = 0$ then.

A) $\operatorname{Re}(z) < 0$

B) $\operatorname{Re}(z) = 0$

C) $\operatorname{Im}(z) = 0$

D) $z^4 = 1$

$z + z^3 = 0$

$z(1 + z^2) = 0$

$z = 0$ OR $z^2 + 1 = 0$

$z = 0 + 0 \cdot i$

$\boxed{\operatorname{Re}(z) = 0}$

$\operatorname{Im}(z) = 0$

$z^2 = -1$

$z = \pm\sqrt{-1}$

$z = \pm i$

$0 + 1 \cdot i$

$\boxed{\operatorname{Re}(z) = 0}$ $\operatorname{Im}(z) = 1$

$0 + (-1) i$

$\boxed{\operatorname{Re}(z) = 0}$, $\operatorname{Im}(z) = -1$

Q find $f(3+2i)$ if

Com. Qs in all Sheets

③ $f(x) = x^4 - 4x^3 + 4x^2 + 10x + 45$?

$f(x) = \cancel{(x^2 - 6x + 13)}(x^2 + 2x + 3) + 2x + 6$

$f(x) = 2x + 3 \Rightarrow f(3+2i) = 2(3+2i) + 6$

$= 12 + 4i$ Ans

$$\begin{array}{r|l} x^2 - 6x + 13 & x^4 - 4x^3 + 4x^2 + 10x + 45 \quad (x^2 + 2x + 3 \\ & -x^4 \mp 6x^3 \pm 13x^2 \\ \hline & 2x^3 - 9x^2 + 10x \\ & 2x^3 - 12x^2 + 26x \\ \hline & 3x^2 - 16x + 45 \\ & 3x^2 - 18x + 39 \\ \hline & 2x + 6 \end{array}$$

① $x = 3 + 2i \Rightarrow x - 3 = 2i$

$(x-3)^2 = -4$

$x^2 - 6x + 13 = 0$