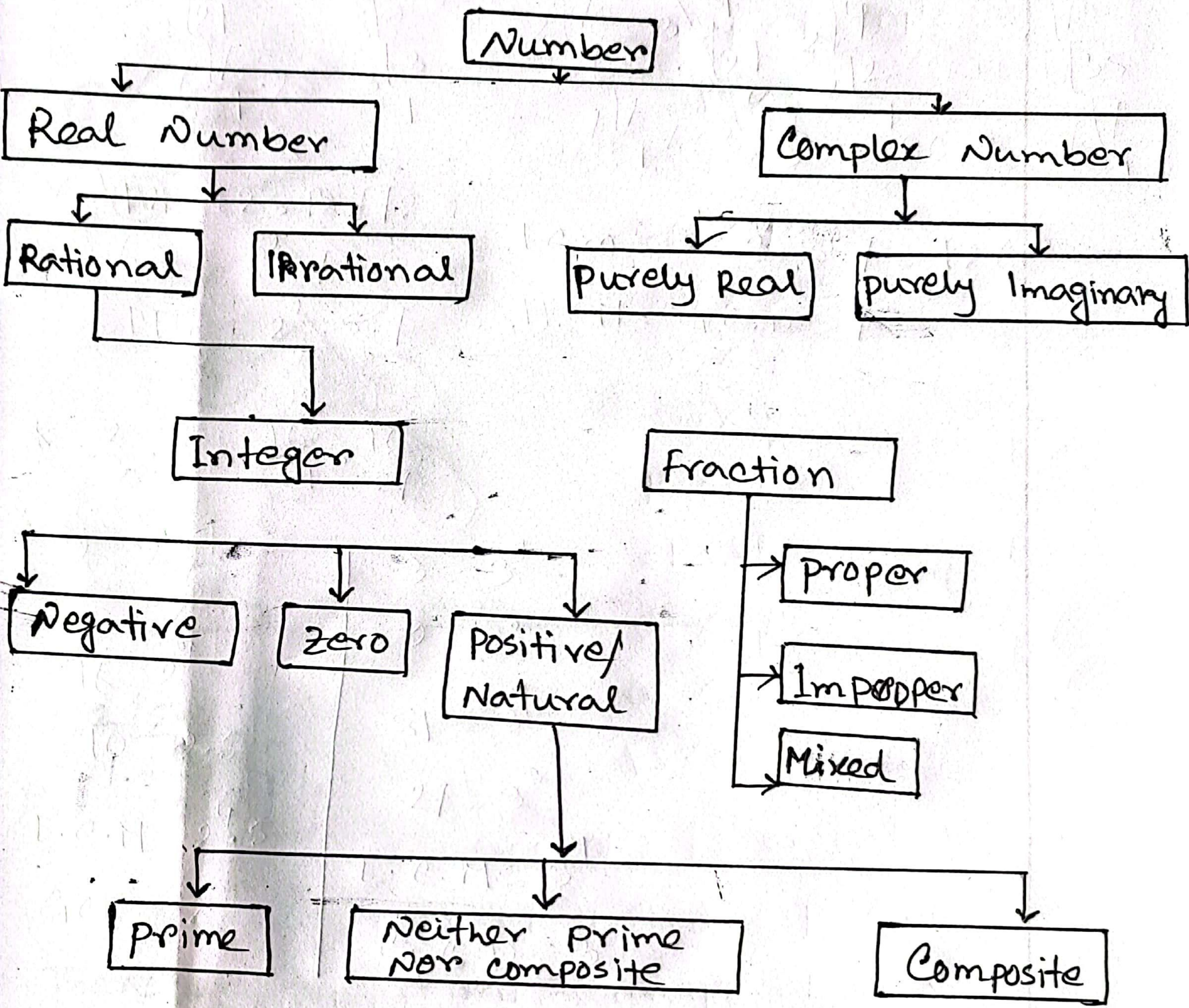
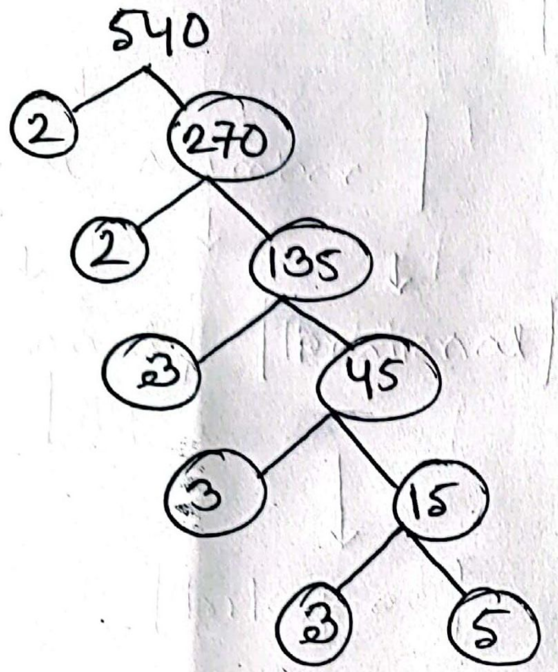
Ans. to the ques. No - 1



Ans to the Q: NO- 2



∴ The prime Factorization of 540 is $= 2^2 \cdot 3^3 \cdot 5$

Ans. to the Q. NO- 3

$$
\begin{array}{r|l}
2 & 540 \\
2 & 270 \\
3 & 135 \\
3 & 45 \\
3 & 15 \\
 & 5
\end{array}
$$

There fore, the prime factorization of 540 is $= 2^2 \cdot 3^3 \cdot 5$

So, the total number of factors of 540 is $= (2+1) \cdot (3+1) \cdot (1+1)$

$= 3 \cdot 4 \cdot 2$

$= 24.$

Calculation for all factors

$540 = 1 \times \cancel{4}540$

$= 2 \times 270$

$= 3 \times 180$

$= 4 \times 135$

$= 5 \times 108$

$= 6 \times 90$

$= 9 \times 60$

$= 10 \times 54$

$= 12 \times 45$

$= 15 \times 30$

$= 18 \times 30$

$= 20 \times 27$

The factors of 540 are

1, 2, 3, 4, 5, 6, 9, 10, 12, 15, 18, 20, 27,

30, 36, 45, 54, 60, 90, 108, 135, 180, 270, 540.

Ans to the Ques. NO-4

$$\begin{array}{r|l} 2 & 240 \\ 2 & 120 \\ 2 & 60 \\ 2 & 30 \\ 3 & 15 \\ & 5 \end{array} \qquad \begin{array}{r|l} 2 & 540 \\ 2 & 270 \\ 3 & 135 \\ 3 & 45 \\ 3 & 15 \\ & 5 \end{array}$$

$\therefore 240 = 2^4 . 3 . 5$ $\qquad \therefore 540 = 2^2 . 3^3 . 5$

L.CM of $(240, 540) = 2^4 . 3^3 . 5 = 2160$

GCD of $(240, 540) = 2^2 . 3 . 5 = 60$

Ans. to the Ques NO-5

$42 = 2 \times 21 = 2 \times 3 \times 7$

$63 = 3 \times 21 = 3 \times 3 \times 7 = 3^2 \times 7$

$140 = 2 \times 70 = 2 \times 2 \times 35 = 2^2 \times 5 \times 7$

LCM of $(42, 63, 140) = 2^2 . 3^2 . 5 . 7$

$= 1260$

and HCF of $(42, 63, 140) = 7$.

Ans. to the Ques. No - 6

Find the LCM and HCF of $2/3, 8/9, 16/81$ and $10/27$

Calculation of Numerator	Calculation of Denominator
$2 = 2^1$	$3 = 3^1$
$8 = 2^3$	$9 = 3^2$
$16 = 2^4$	$81 = 3^4$
$10 = 2 \times 5$	$27 = 3^3$

$\therefore$ LCM of Numerator $= 2^4 \times 5 = 80$ $\therefore$ LCM of Denominator $= 3^4 = 81$

HCF of Numerator $= 2$ HCF of Denominator $= 3$

$\therefore$ HCF of $2/3, 8/9, 16/81$ and $10/27 = \frac{2}{81}$

and LCM of $2/3, 8/9, 16/81$ and $10/27 = \frac{80}{3}$

Ans. to the Q. No. 17

$$z = \frac{1+\sqrt{3}i}{1-\sqrt{3}i} = \frac{1^2+2.1.\sqrt{3}i+(\sqrt{3}i)^2}{1-3i^2} = \frac{1+2\sqrt{3}i-3}{4} = \frac{-2+2\sqrt{3}i}{4}$$

$$= -\frac{1}{2}+\frac{\sqrt{3}i}{2}$$

where, $x = -1/2$ and $y = \frac{\sqrt{3}}{2}$

$$\therefore r = \sqrt{x^2+y^2} = \sqrt{(-1/2)^2+(\sqrt{3}/2)^2} = \sqrt{1/4+\frac{3}{4}} = \sqrt{1} = 1$$

$$\theta = \pi - \tan^{-1}(y/x) = \pi - \tan^{-1}\left(\frac{\sqrt{3}/2}{-1/2}\right) = \pi - \tan^{-1}(-\sqrt{3})$$

$$= \pi - 2\pi/3 = \frac{3\pi-2\pi}{3} = \frac{\pi}{3}$$

so, the polar form is $z = r(\cos\theta + i\sin\theta)$

$$= 1 \cos \pi/3 + i \sin \pi/3$$

and exponential form, $z = e^{i\pi/3}$

Ans. to the Q. No - 8

Evaluate $\sqrt{-16} \times \sqrt{-4}$ and $\dfrac{\sqrt{-16}}{\sqrt{-4}}$

$\therefore \sqrt{-16} \times \sqrt{-4}$ and $\dfrac{\sqrt{-16}}{\sqrt{-4}}$

$= \sqrt{16i} \times \sqrt{4i}$ $\qquad = \dfrac{4i}{2i}$

$= 4i \times 2i$

$= 8i^2$ $\qquad = 2$

$= -8$

Ans. to the Q. No - 9

Here given that

$z = 2+i$

$8z - z^2 = 8(2+i) - (2+i)^2$

$= 16 + 8i - (4 + 4i + i^2)$

$= 16 + 8i - 4 - 4i + 1$

$= 13 + 4i$

Modulus, $r = \sqrt{x^2+y^2}$
$= \sqrt{(13)^2+4^2}$
$= \sqrt{185}$

Arg., $\theta = \tan^{-1}(y/x)$
$= \tan^{-1}(4/13)$
$= 17.1$

Ans. to the Ques. No - 10

Here, $z = x+iy = 1+i\sqrt{3}$

$\therefore x = 1$ and $y = \sqrt{3}$

$r = \sqrt{x^2+y^2}$
$= \sqrt{1^2+(\sqrt{3})^2}$
$= 2$

Arg, $\theta = \tan^{-1}(y/x)$
$= \tan^{-1}(\sqrt{3}/1)$
$= \pi/3$

Therefore, $r(\cos\theta + i\sin\theta)$ form is

$= 2(\cos\pi/3 + i\sin\pi/3)$.

Scanned with CamScanner