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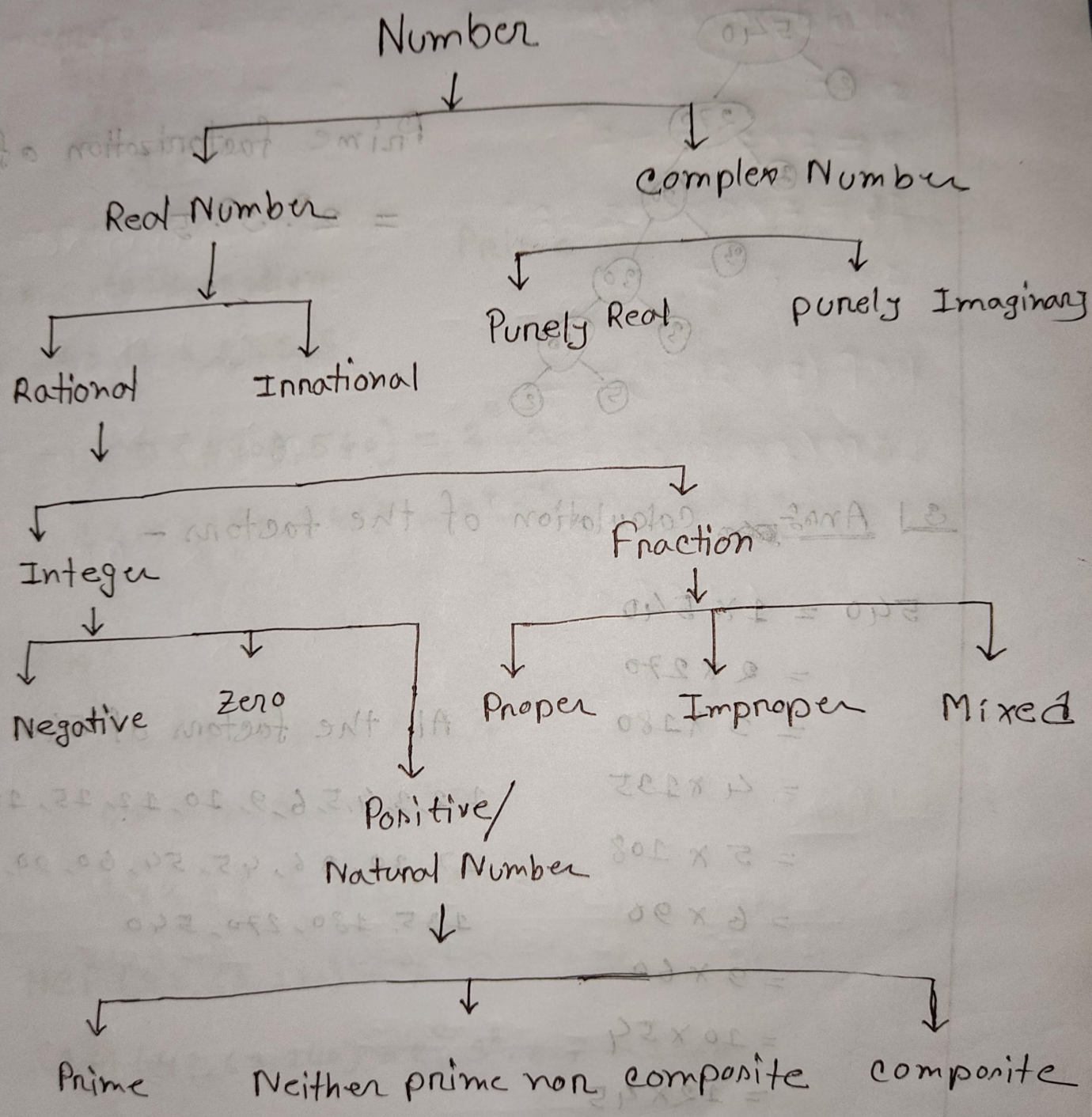
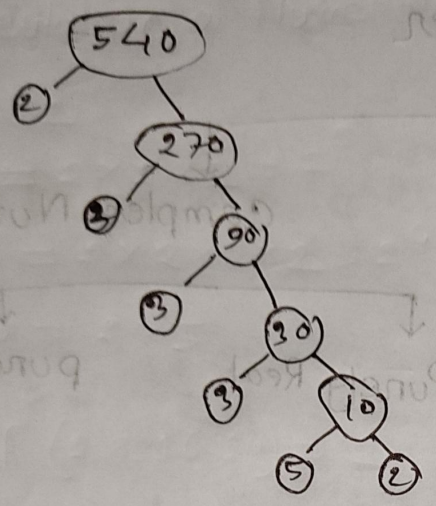
221-15-4846

1] Ans:- Classification of number System-



2] Ans:- Tree diagram of 540



Prime factorization of 540 is

$= 2^2 \cdot 3^3 \cdot 5$

3] Ans:- Calculation of the factors -

$540 = 1 \times 540$

$= 2 \times 270$

$= 3 \times 180$

$= 4 \times 135$

$= 5 \times 108$

$= 6 \times 90$

$= 9 \times 60$

$= 10 \times 54$

$= 12 \times 45$

$= 15 \times 36$

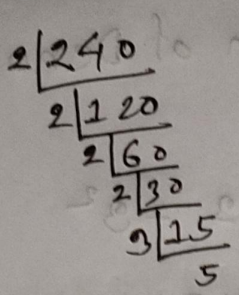
$= 18 \times 30$

$= 20 \times 27$

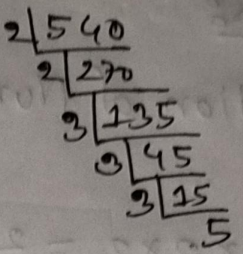
All the factors of 540 are

1, 2, 3, 4, 5, 6, 9, 10, 12, 15, 18, 20, 27, 30, 36, 45, 54, 60, 90, 108, 135, 180, 270, 540

4] Ans:



Prime factorization of 240 is $= 2^4 \cdot 3 \cdot 5$



Prime factorization of 540 is $= 2^2 \cdot 3^3 \cdot 5$

$GCD(240, 540) = 2^2 \cdot 3 \cdot 5 = 60$

$LCM(240, 540) = 2^4 \cdot 3^3 \cdot 5 = 2160$

5] Ans:

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

$63 = 3 \cdot 3 \cdot 7 = 3^2 \cdot 7$

$140 = 2 \cdot 2 \cdot 5 \cdot 7 = 2^2 \cdot 5 \cdot 7$

$HCF(42, 63, 140) = 7$

$LCM(42, 63, 140) = 2^2 \cdot 3^2 \cdot 5 \cdot 7 = 1260$

6) Ans:-

Calculation of Numerators

$2 = 2$

$8 = 2 \times 2 \times 2 = 2^3$

$16 = 2 \times 2 \times 2 \times 2 = 2^4$

$10 = 2 \times 5$

HCF $(2, 8, 16, 10) = 2$

LCM $(2, 8, 16, 10) = 2^4 \times 5$

$= 80$

Calculation of Denominators

$3 = 3$

$9 = 3 \times 3 = 3^2$

$81 = 3 \times 3 \times 3 \times 3 = 3^4$

$27 = 3 \times 3 \times 3 = 3^3$

HCF $(3, 9, 81, 27) = 3$

LCM $(3, 9, 81, 27) = 3^4$

$= 81$

$\therefore$ HCF of $\left(\frac{2}{3}, \frac{8}{9}, \frac{16}{81}, \frac{10}{27}\right) = \frac{2}{81}$

LCM of $\left(\frac{2}{3}, \frac{8}{9}, \frac{16}{81}, \frac{10}{27}\right) = \frac{80}{3}$

7) Ans:-

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

$$= \frac{-2+2\sqrt{3}i}{4} = -\frac{1}{2} + \frac{\sqrt{3}}{2}i$$

$$\text{Mod} = \sqrt{\left(-\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2} = \sqrt{1} = 1$$

$$\text{Arg} = \tan\pi - \tan^{-1}\left|\frac{-\sqrt{3}}{1}\right|$$

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

Polar from is, $z = r(\cos\theta + i\sin\theta)$

$= 1\left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$

$= \left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$

exponential from is, $z = e^{i\frac{2\pi}{3}}$

8| Ans:

$\sqrt{-16} \times \sqrt{-4}$

$= \sqrt{16i^2} \times \sqrt{4i^2}$ $[i^2 = -1]$

$= \sqrt{4^2 i^2} \times \sqrt{2^2 i^2}$

$= 4i \times 2i$

$= -8$

$\frac{\sqrt{-16}}{\sqrt{-4}}$

$= \frac{\sqrt{16i^2}}{\sqrt{4i^2}}$

$= \frac{\pm 4i}{2i}$

$= 2$

9| Ans:

$8z - z^2$

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

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

$= 13 + 4i$

Mod, $r = \sqrt{13^2 + 4^2}$

$= \sqrt{185}$

Whene,

$x + yi$

$x = 13$

$y = 4$

Arg, $\theta = \tan^{-1}\frac{4}{13}$

$= 17.102$

10| Ans:

$1 + i\sqrt{3}$

$\text{Mod. } r = \sqrt{1^2 + (\sqrt{3})^2} = 2$

$\text{Arg. } \theta = \tan^{-1}\left|\frac{\sqrt{3}}{1}\right| = \frac{\pi}{3}$

$\therefore r(\cos\theta + i\sin\theta) = 2\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$