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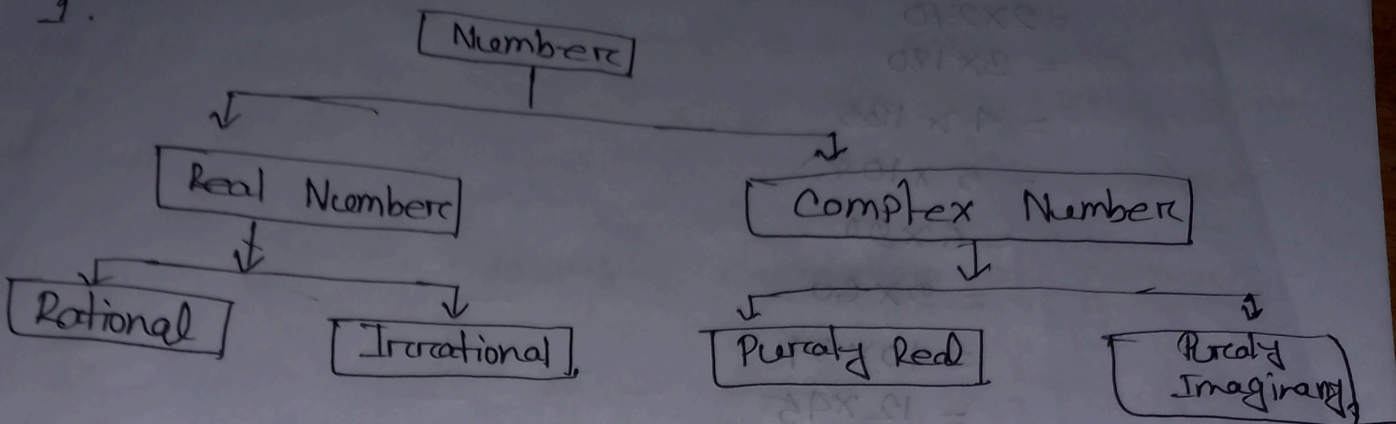
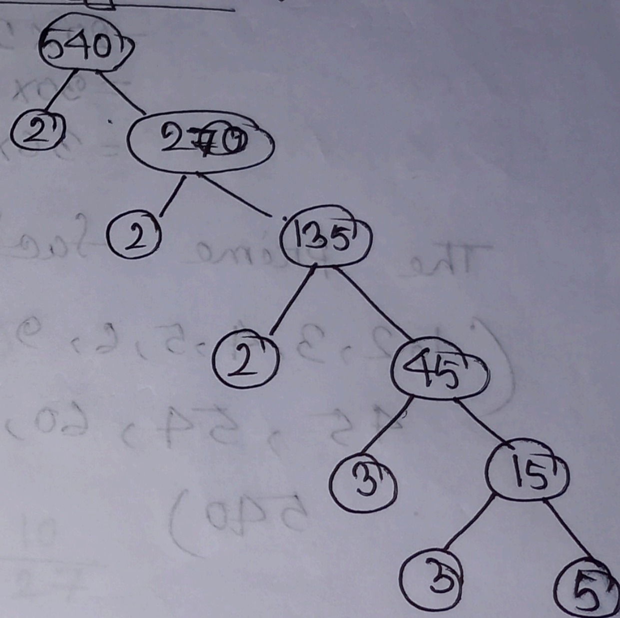
1.



2. Division Method :

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

Tree Diagram :



Multiplication Method :

$$\begin{aligned} 540 &= 2 \times 270 \\ &= 2 \times 2 \times 135 \\ &= 2^2 \times 135 \\ &= 2^2 \times 3 \times 45 \\ &= 2^2 \times 3^2 \times 15 \\ &= 2^2 \times 3^2 \times 5 \end{aligned}$$

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

The prime factors :
(1, 2, 3, 4, 5, 6, 9, 10, 12, 15, 18, 20, 30, 36, 45, 54, 60, 90, 108, 135, 180, 270, 540)

4. $240 = 2\times 120$
$= 2\times 2\times 2\times 30$
$= 2^4\times 3\times 5$

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

L.C.M $(240, 140) = 2^4\cdot 3\cdot 5\cdot 7$
$= 1680$

G.C.D $(240, 140) = 2^2\cdot 5$
$= 4\cdot 5$
$= 20$

5. $42 = 2 \times 21 = 2 \cdot 3 \cdot 7$

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

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

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

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

6. Calculation of numbers:

$2 = 2^1$

$8 = 2^3$

$16 = 2^4$

$10 = 2 \cdot 5$

$\therefore$ LCM $= 2^4 \cdot 5$

HCF $= 2$

Calculation of numbers:

$3 = 3^1$

$9 = 3^2$

$81 = 3^4$

$27 = 3^3$

LCM $= 3^4$

HCF $= 3$

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

$= \frac{\text{LCM of } (2, 8, 16, 10)}{\text{GCD of } (3, 9, 82, 27)}$

$= \frac{2^4 \cdot 5}{3}$

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

$= \frac{\text{GCD of } (2, 8, 16, 10)}{\text{LCM of } (3, 9, 81, 27)}$

$= \frac{2}{3^4}$ Ans.

7. $Z = \frac{1+\sqrt{3}i}{1-\sqrt{3}i}$

Notation $= |z|$

Rule $|z| = \sqrt{x^2+y^2}$

Suppose,

$Z_1 = 1+\sqrt{3}i$ and $Z_2 = 1-\sqrt{3}i$

$|Z_1| = \sqrt{(1)^2+(\sqrt{3})^2} = \sqrt{4} = 2$

$|Z_2| = \sqrt{(1)^2+(-\sqrt{3})^2} = \sqrt{4} = 2$

$\therefore$ Modulas of $|z| = \frac{2}{2} = 1$ ~~Ar~~

~~And~~

Z's ~~Argument~~ is $\theta_1 = \tan^{-1}\frac{y}{x}$

$= \tan^{-1}\sqrt{3}$

$= 60^\circ$

Z_2's ~~Argument~~ is $\theta_2 = 360^\circ - \tan^{-1}\frac{y}{x}$

$= 360^\circ - \tan^{-1}\sqrt{3}$

$= 300^\circ$

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

$= 4i \times 2i$

$= 8i^2$

$= -8$

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

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

$= 2$

9. $8z - z^2$

$= 8(2+1) - (2+i)^2$

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

$= 13 + 4i$

Modulus $= \sqrt{13^2 + 4^2} = \sqrt{185}$

Argument $= \tan^{-1}\left(\frac{4}{13}\right) =$ ~~[illegible]~~

10. $1 + i\sqrt{3}$

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

$= \sqrt{4}$

$= 2$

$\theta = \tan^{-1}\left(\frac{\sqrt{3}}{1}\right)$

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

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