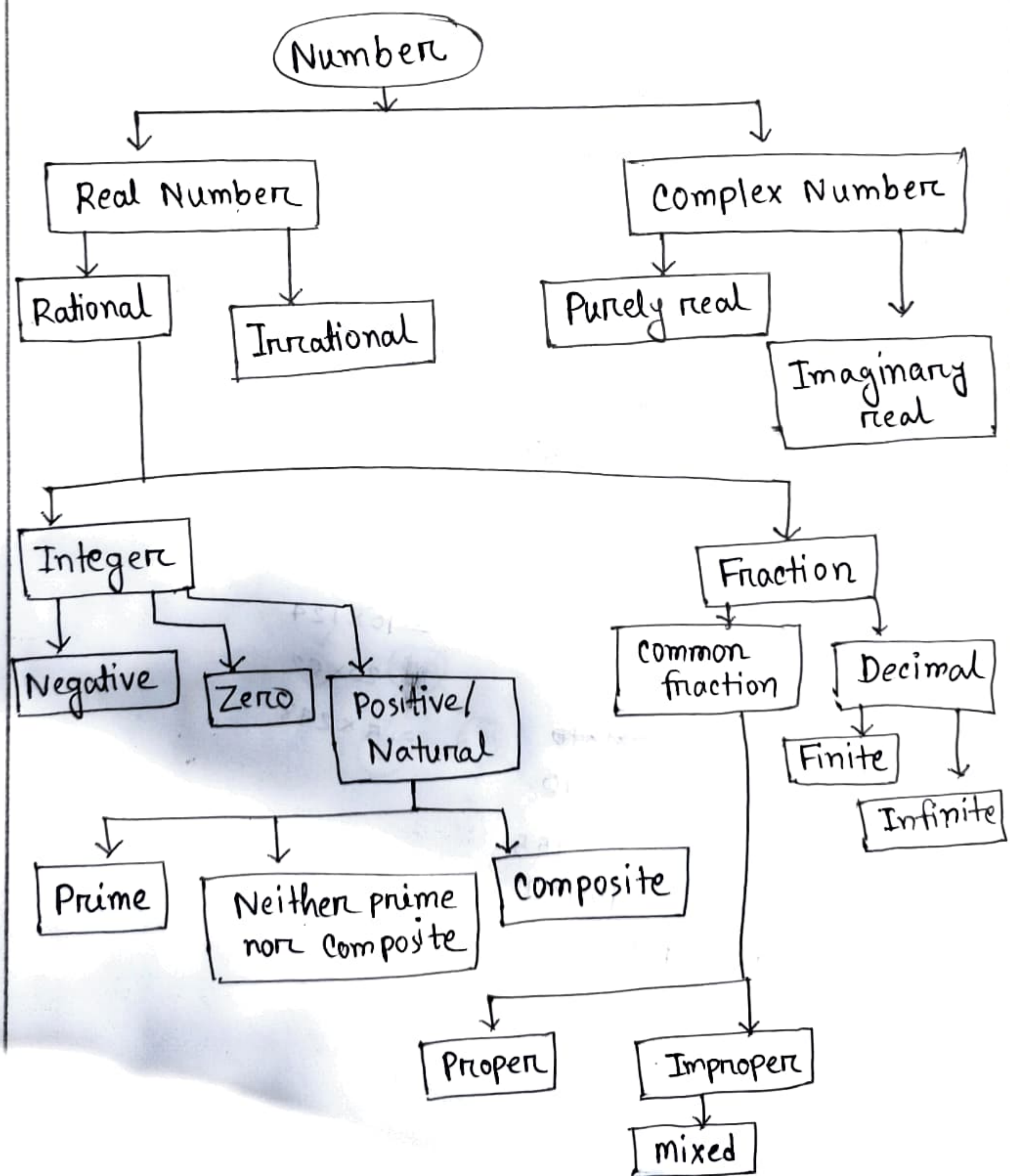
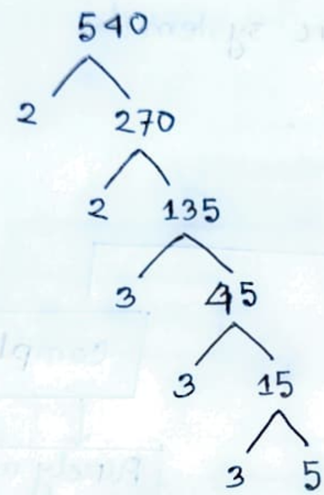
Answer to the question No (1):

classification of number system :



2//

Answer to the question No (2):



Therefore the Prime factorization of 540 is =

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

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Answer to the question No (3):

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

Calculatio for all factors:

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

Therefore,

the prime factorization of

540 is $= 2^2 . 3^3 . 5$

so the total number of

factors of 540 is $= (2+1)(3+1)(1+1)$
$= 3.4.2$
$= 24$

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

Answer to the question NO (4):

$240 = 2\times120 = 2\times2\times60 = 2\times2\times2\times30 = 2\times2\times2\times2\times15 = 2^4 \cdot 3\times5$

$540 = 2\times270 = 2\times2\times135 = 2\times2\times3\times45 = 2\times2\times3\times3\times15 = 2^2\times3^3\times5$

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

HCF or GCD $(240, 540) = 2 \cdot 3 \cdot 5 = 30$

Answer to the question NO (5):

$42 = 2\times21 = 2\times3\times7$

$63 = 3\times21 = 3\times3\times7 = 3^2\times7$

$140 = 2\times70 = 2\times2\times35 = 2^2\times5\times7$

$\therefore$ LCM $(42, 63, 140) = 2^2\times3^2\times5\times7 = 1260$

HCF $(42, 63, 140) = 2\times7 = 14$

Answer to the question No (6):

Calculation for Numerators

$2 = 2^1$

$8 = 2^3$

$16 = 2^4$

$10 = 2^1 \times 5^1$

$LCM(2,8,16,10) = 2^4 \times 5 = 80$

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

Calculation for Denominators

$3 = 3^1$

$9 = 3^2$

$81 = 3^4$

$27 = 3^3$

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

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

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

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

Answer to the question No (7):

We have, $\dfrac{1+\sqrt{3}i}{1-\sqrt{3}i}$

$= \dfrac{(1+\sqrt{3}i)(1+\sqrt{3}i)}{(1-\sqrt{3}i)(1-\sqrt{3}i)}$

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

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

$= \dfrac{2(-1+\sqrt{3}i)}{4}$

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

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

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

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

$r = \sqrt{\frac{1}{4}+\frac{3}{4}} = \sqrt{\frac{4}{4}} = 1$

$\therefore$ Modulas of $z = 1$

And Argument of z

$\theta = \pi - \tan^{-1}\left|\dfrac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}\right|$

$= \pi - \tan^{-1}(\sqrt{3})$

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

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

Polar form is $-\frac{1}{2}+\frac{\sqrt{3}}{2}i$

Exponential form is $z = re^{i\theta}$

$= 1 \cdot e^{i\frac{2\pi}{3}}$

$= e^{\frac{2\pi}{3}i}$

Answer to the question NO (8):

We have, $\sqrt{-16} \times \sqrt{-4}$

$= \sqrt{16}\, i \times \sqrt{4}\, i$

$= 4i \times 2i$

$= 8i^2$

$= -8$

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

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

$= 2$

Answer to the question NO (9):

We have, $z = 2+i$

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

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

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

$= 13 + 4i$

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Modulus $r = \sqrt{(13)^2 + (4)^2}$

$= \sqrt{169 + 16}$

$= \sqrt{185}$

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

$= 17.102$

Answer to the question NO (10):

Let, $z = 1 + i\sqrt{3}$

$z = x + iy$

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

$\theta = \tan^{-1} \left|\frac{y}{x}\right|$

Modulus of $z = \sqrt{(1)^2 + (\sqrt{3})^2}$

$= \sqrt{1+3}$

$= \sqrt{4}$

$= 2$

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Argument of $z = \tan^{-1}\left|\frac{y}{x}\right|$

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

$= \tan^{-1} . \tan\frac{\pi}{3}$

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

Therefore, $r(\cos\theta + i\sin\theta)$ form is $= 2\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$