221-15-577
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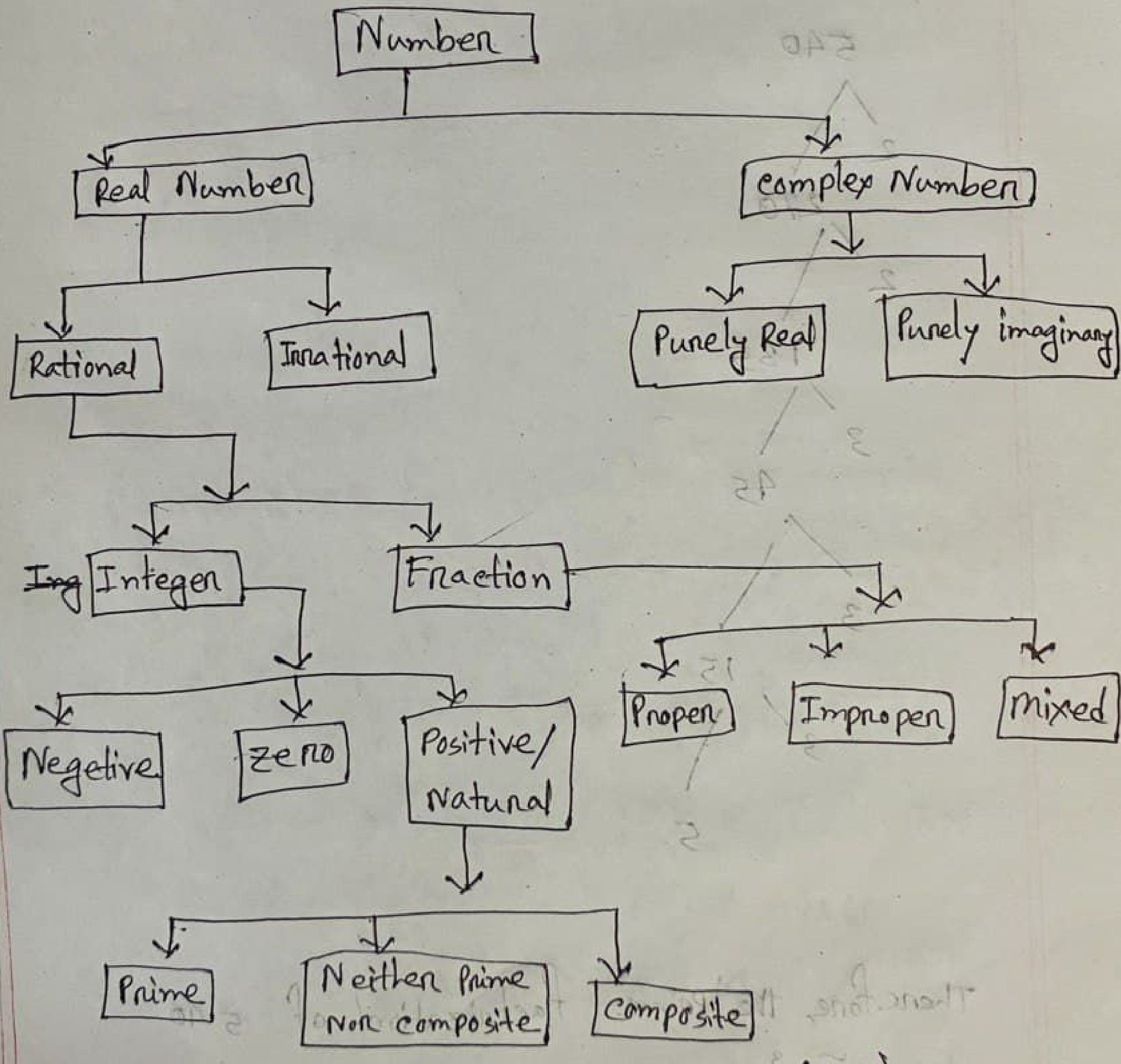
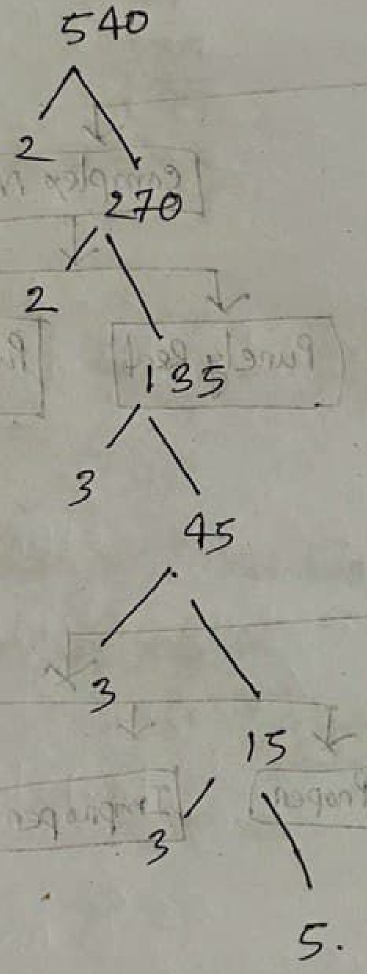
Answer to the exercise No (1)



(Ans)

Answers to the exercise NO: 2



Therefore, the Prime factrization of 540 is $= 2^2 \cdot 3^3 \cdot 5$.

(Ans)

Answer to the exercise question No: 3

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

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

so, the total number of factors of 540 is

$= (2+1)(3+1)(1+1)$

$= 3 \cdot 4 \cdot 2$

$= 24$

calculation for all factors.

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

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 exercise que: No: 4

$240 = 2\times120 = 2\times2\times60 = 2\times2\times30 = 2\times2\times2\times2\times15 = 2^4\times3\times5$

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

$\therefore$ Lcm $(240, 540) = 2^4 . 3^3 . 5 = 2160$

and HcF $(240, 540) = 2^2 . 3 . 5 = 60$

Ans: to the exercise que: No: 5

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

$63 = 3\times21 = 3\times3\times2 = 3^2\times7$

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

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

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

Ans to the Quetion No: 6

Calculation for Numerators

$2 = 2^1$

$8 = 2^3$

$16 = 2^4$

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

Calculation fo Denominators

$3 = 3$

$9 = 3^2$

$81 = 3^4$

$27 = 3^3$

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

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

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

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

$$HcF \text{ of } \frac{2}{3}, \frac{8}{9}, \frac{16}{81} \text{ and } \frac{10}{27} = \frac{HcF(2,8,16,10)}{Lcm(3,9,81,27)} = \frac{2}{81}$$

$$Lcm \text{ of } \frac{2}{3}, \frac{8}{9}, \frac{16}{81} \text{ and } \frac{10}{27} = \frac{Lcm(2,8,16,10)}{Hcm(3,9,81,27)} = \frac{80}{3}.$$

Answer to the Question NO: 7

we have,

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

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

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

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

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

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

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

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

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

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

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

$\therefore$ Modulus of z is $=1$

And Argument of z will

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

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

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

~~Plot~~ Polar Form $-\frac{1}{2}+\frac{\sqrt{3}}{2}i$

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

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

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

$= 8i^2$

$= -8$ $\qquad = 2.$

Answer to the Question No: 9

we have, $z = 2+i$

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

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

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

$= 13+4i$

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

$= \sqrt{169+16}$

$= \sqrt{185}$

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

$= 17.102$

Answer to the Q No: 10

let $z = 1 + i\sqrt{3}$ $z = x + iy$ $|z| = \sqrt{x^2 + y^2}$

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

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

$= \sqrt{1+3}$

$= 2.$

$\therefore r = 2$

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