

NAME : Shraboni Goswami

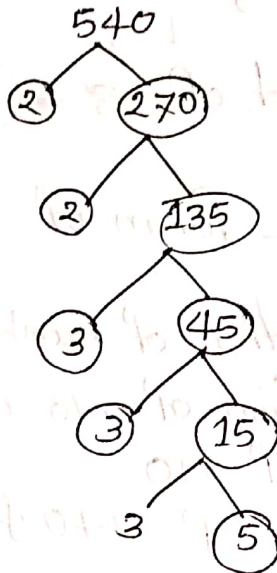
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২নং প্রশ্নের উত্তর:

② Division method

$$\begin{array}{r} 2 \overline{) 540} \\ \underline{2 \ 270} \\ 2 \overline{) 135} \\ \underline{2 \ 45} \\ 3 \overline{) 15} \\ \underline{3 \ 5} \\ 5 \end{array}$$

Three Diagram



Multiplication Method

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

Ans to the question no-③

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

The prime factors are :

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

Ans to the question no - (4)

(4)

$$\begin{aligned}240 &= 2 \times 120 \\ &= 2 \times 2 \times 2 \times 30 \\ &= 2^4 \times 3 \times 5\end{aligned}$$

$$\begin{aligned}140 &= 2 \times 70 \\ &= 2 \times 2 \times 35 \\ &= 2^2 \times 5 \times 7\end{aligned}$$

$$\begin{aligned}\text{L.C.M}(240, 140) &= 2^4 \cdot 3 \cdot 5 \cdot 7 \\ &= 1680\end{aligned}$$

$$\begin{aligned}\text{G.C.D}(240, 140) &= 2^2 \cdot 5 \\ &= 4 \cdot 5 = 20\end{aligned}$$

Ans to the question no - (5)

(5)

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

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

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

$$\therefore \text{L.C.M}(42, 63, 140) = 2^2 \cdot 3^2 \cdot 5 \cdot 7 = 1260$$

$$\therefore \text{H.C.F}(42, 63, 140) = 7$$

Ans to the question no - (6)

(6) $\frac{2}{3}, \frac{8}{9}, \frac{16}{81}$ and $\frac{10}{27}$

\therefore Calculation for numbers:

$$2 = 2^1$$

$$8 = 2^3$$

$$16 = 2^4$$

$$10 = 2 \cdot 5$$

$$\therefore \text{L.C.M} = 2^4 \cdot 5$$

$$\text{G.C.D} = 2$$

Calculation of Denominators:

$$3 = 3^1$$

$$9 = 3^2$$

$$81 = 3^4$$

$$27 = 3^3$$

$$\therefore \text{L.C.M} = 3^4$$

$$\text{G.C.D} = 3$$

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

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

and,

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

$$= \frac{2}{3^4} \text{ Ans!}$$

Ans to the question no. ~~6~~ 7

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

Notation = $|z|$

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

Suppose,

$$z_1 = 1 + \sqrt{3}i \text{ and } z_2 = 1 - \sqrt{3}i$$

$$\therefore |z_1| = \sqrt{(1)^2 + (\sqrt{3})^2} = \sqrt{4} = 2$$

$$|z_2| = \sqrt{(1)^2 + (-\sqrt{3})^2} = \sqrt{4} = 2$$

$$\therefore \text{Modulus of } |z| = \frac{2}{2} = 1 \text{ Ans!}$$

And z_1 's Argument is $\theta_1 = \tan^{-1} \frac{y}{x}$
 $= \tan^{-1} \sqrt{3}$
 $= 60^\circ$

z_2 's Argument is $\theta_2 = \tan^{-1} 360^\circ - \tan^{-1} \frac{y}{x}$
 $= 360^\circ - \tan^{-1} \sqrt{3}$
 $= 300^\circ$

8. $\sqrt{-16} \times \sqrt{-4}$
 $= 4i \times 2i$
 $= 8i^2$
 $= -8 \text{ Ans}$

| $\frac{\sqrt{-16}}{\sqrt{-4}}$
 $= \frac{4i}{2i} = 2 \text{ Ans}$

9. $8z - z^2$
 $= 8(2+i) - (2+i)^2$
 $= 16 - 8i - 4 - 4i - i^2$
 $= 13 + 4i$

Modulus $= \sqrt{13^2 + 4^2}$
 $= \sqrt{185} = 13.60$

Argument $= \tan^{-1} \left(\frac{4}{13} \right) = 17.10^\circ$

10.

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

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

$$= \sqrt{4} = 2$$

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

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

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



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

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

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

$$= 1 + i\sqrt{3}$$

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