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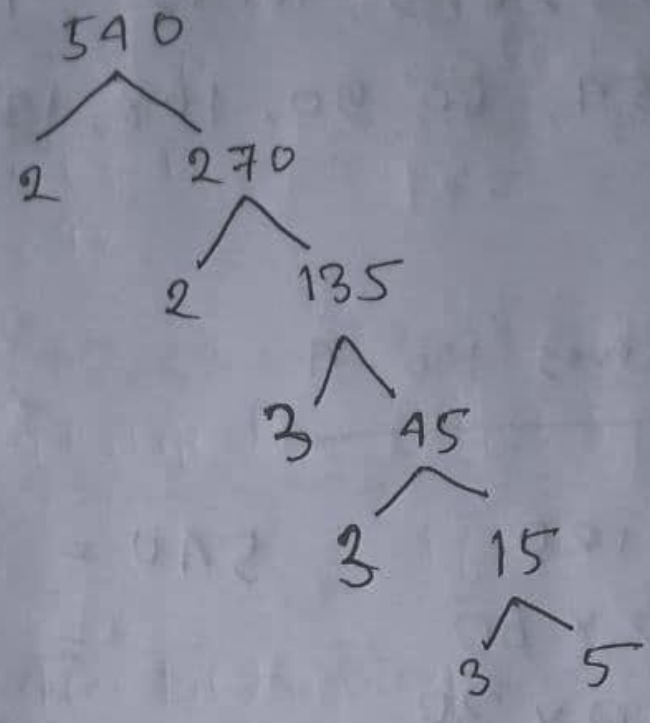
Ans to the Ques No - 2



$$540 = 2 \times 2 \times 3 \times 3 \times 3 \times 5$$

$$= 2^3 \times 3^3 \times 5$$

Ans to the Ques No - 3

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

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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.

Ans to the Ques No - 4

$240 = 2 \times 120$
$= 2 \times 2 \times 60$
$= 2^2 \times 2 \times 30$
$= 2^3 \times 2 \times 15$
$= 2^4 \times 3 \times 5$

$540 = 2 \times 270$
$= 2 \times 2 \times 135$
$= 2^2 \times 3 \times 45$
$= 2^2 \times 3 \times 3 \times 15$
$= 2^2 \times 3^2 \times 3 \times 5$
$= 2^2 \times 3^3 \times 5$

L.C.M (240 and 540) $= 2^4 \cdot 3^3 \cdot 5 = 2160$

G.C.D (240 and 540) $= 2^2 \cdot 3 \cdot 5 = 60$

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Ans to the Ques 5

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

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

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

L.C.M = (42, 63 and 140) $= 2^2 \times 3^2 \times 5 \times 7 = 1260$

H.C.F. (42, 63 and 140) = 7

Ans to the Ques No - 6

Calculation for Numerator

$2 = 2^1$

$8 = 2^3$

$16 = 2^4$

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

LCM $= 2^4 \times 5 = 80$

HCF = 2

Calculation for Denominator.

$3 = 3^1$

$9 = 3^2$

$81 = 3^4$

$27 = 3^3$

LCM $= 3^4 = 81$

HCF = 3

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

$= \frac{HCF(2,8,16,10)}{LCM} \quad \frac{2}{81}$

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

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

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

$= \frac{80}{3}$

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Ans to the Ques No - 7

We have,

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

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

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

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

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

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

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

Let,

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

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

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

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

$$= \sqrt{1}$$

$$= 1$$

$\therefore$ Modulus of $z = 1$

Argument

$\theta =$

$= \pi -$

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Argument:

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

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

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

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

~~Exponential form~~,

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

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

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

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8. Ans to the Ques No - 8

We have,

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

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

$= 4i \times 2i$

$= 8i^2$

$= -8$

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

$= 2$

Ans to the Ques No - 9

we have,

$z = 2 + i$

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

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

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

$= 13 + 4i$

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~~Modulus r = $\sqrt{13}$~~

So, $x = 13$ and $y = 4$

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

$= \sqrt{169 + 16}$

$= \sqrt{185}$

Argument,

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

$= 17.10^\circ$

Ans to the Ques 10

$1 + i\sqrt{3}$

$r = \sqrt{1^2 + (\sqrt{3})^2}$ $\quad \theta = \tan^{-1}\frac{\sqrt{3}}{1}$

$= \sqrt{4}$ $\quad = \frac{\pi}{3}$

$= 2$

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