

1. Sol)

2. $\cos \alpha = r \sin \alpha - 1$

$$1 + \cos \alpha = \sin^2 \Rightarrow 1 - \cos \alpha = r \sin \alpha$$

3. $r \sin^2 \alpha = r \sin \alpha - 1$

$$1 - r \sin^2 \alpha = \cos \alpha$$

4. $r \sin \alpha + r \sin \alpha - r = 0 \Rightarrow \sin \alpha + r \sin \alpha - r = 0$

5. $(\sin \alpha + r \sin \alpha - 1) \Rightarrow \sin \alpha = \frac{1}{r}, \sin \alpha = -\frac{1}{r} \Rightarrow \sin \alpha = -\frac{1}{r} \Rightarrow$

6. $\alpha = r\pi + \frac{\sqrt{r}}{r}, r\pi + \frac{17\pi}{4} = \alpha$

7.

8. $\rightarrow \cos \alpha + \cos \alpha - r = 0 \Rightarrow \frac{1 + \cos \alpha}{r} = \cos \alpha \Rightarrow \cos \alpha = r \cos \alpha - 1$

9. $r \cos \alpha + \cos \alpha - r = 0$

10. $\cos \alpha + \cos \alpha - \alpha = 0 \Rightarrow (\cos \alpha + r)(\cos \alpha - r) \Rightarrow \cos \alpha = 1$

11. $\cos \alpha = \cos 0 \Rightarrow \alpha = r\pi = 0 \Rightarrow r$

12. Sol)

13. $\sin^2 - \cos^2 = \sin \alpha$

14. $\cos^2 - \sin^2 = -(\sin^2 - \cos^2)$

15. $\cos^2 - \sin^2 = -\sin \alpha \Rightarrow \cos \alpha \rightarrow \sin(-r\pi) = \cos r\pi = \sin\left(\frac{\pi}{r} - r\pi\right)$

16. $-r\pi = r\pi + \frac{\pi}{r} - r\pi \Rightarrow -r\pi = r\pi + \frac{\pi}{r} \Rightarrow r\pi - \frac{\pi}{r} = \frac{\pi}{2}$

17. $\rightarrow$

18. $r \cos^2 + r \sin \cos = 1$

19. $r \cos^2 - 1 + r \sin \cos = 0 \Rightarrow \cos \alpha + \sin \alpha = 0 \Rightarrow \cos \alpha = \sin(-\pi)$

20. $\sin\left(\frac{\pi}{r} - r\pi\right) = \sin(-r\pi) \Rightarrow -r\pi = r\pi + \frac{\pi}{r} - r\pi \Rightarrow 0$

21. $-r\pi = r\pi + \pi - \frac{\pi}{r} + r\pi \Rightarrow -r\pi = r\pi + \frac{\pi}{r} \Rightarrow \alpha = \frac{r\pi}{r} - \frac{\pi}{r}$

22.

23. $r \cos \alpha \cot(\alpha) (r \cos \alpha + 1) = \frac{1}{\sin \alpha} \Rightarrow \cos \alpha (r \cos \alpha + 1) = 1$

24. $r \cos \alpha + \cos \alpha - 1 = 0$

25. $\frac{1 \pm r}{r} = \frac{1}{r} \Rightarrow 1 \Rightarrow \cos \alpha = \frac{1}{r}, \alpha = r\pi \pm \frac{\pi}{r}$

26. $\cos \alpha = -1 \Rightarrow \alpha = r\pi \pm \pi$

27.

28. $\rightarrow r \sin^2 - \sin \alpha \cos \alpha + \cos^2 = r$

29.

30. $\sin^2 + 1 - \sin \cos = r \Rightarrow \sin^2 - 1 = \sin \cos = -\cos^2$

31.

31. $\sin = -\cos \Rightarrow \sin + \cos = 0 \Rightarrow \sqrt{2} \sin\left(\frac{\alpha + \pi}{2}\right) = 0 \Rightarrow \alpha = r\pi - \frac{\pi}{2}$

Benobar sin $\left(\alpha + \frac{\pi}{2}\right) = 0$

$$\alpha = r\pi - \frac{\pi}{2}$$

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$$\text{sol)} \cos\left(\frac{\pi}{2} + x\right) \cos\left(x - \frac{\pi}{2}\right) = \frac{1}{2}$$

(15)

$$\cos\left(\frac{\pi}{2} + x\right) \cos\left(\frac{\pi}{2} - x\right) = \frac{1}{2} \Rightarrow \cos\left(\frac{\pi}{2} + x\right) \sin\left(\frac{\pi}{2} + x\right) = \frac{1}{2}$$

$$\frac{1}{2} \sin\left(\frac{\pi}{2} + x\right) = \frac{1}{2} \Rightarrow \frac{1}{2} \cos x = \frac{1}{2} \Rightarrow \cos x = \frac{1}{2}$$

$$x = \pi \pm \frac{\pi}{3} \Rightarrow x = k\pi \pm \frac{\pi}{3}$$

$$\therefore \cos\left(\pi - \frac{\pi}{3}\right) = -\sin x = \sin(-x) = \cos\left(\frac{\pi}{3} + x\right)$$

$$x - \frac{\pi}{3} = \pi \pm \left(\frac{\pi}{3} + x\right) \Rightarrow x - \frac{\pi}{3} = \pi + \frac{\pi}{3} + x \quad \text{or} \quad x - \frac{\pi}{3} = \pi - \frac{\pi}{3} + x$$

$$\Rightarrow x - \frac{\pi}{3} = \pi + \frac{\pi}{3} + x \quad \text{or} \quad x - \frac{\pi}{3} = \pi - \frac{\pi}{3} + x$$

$$\cos^2 + \sin^2 = 1$$

$$\frac{\sin^2 x + \sin^2 x}{\sin^2 x} = \frac{\cos^2 x + \sin^2 x}{\sin^2 x} = 1$$

(16)

$$\sin^2 x + \sin^2 x = 2 \sin^2 x$$

$$\sin^2 x = 0 \Rightarrow x = 0 \text{ or } \pi \Rightarrow x = \frac{k\pi}{2}, \quad k \text{ even}$$

$$\sin^2 x$$

$$\frac{1}{1 + \cos^2 x} = \frac{1}{\sin^2 x} + \cot^2 x = \frac{1 + \cos^2 x}{\sin^2 x}$$

(17)

$$\frac{1 - \cos^2 x}{\sin^2 x} = \frac{1 + \cos^2 x}{\sin^2 x} \Rightarrow 1 - \cos^2 x = 1 + \cos^2 x$$

$$\cos^2 x = -\cos^2 x \Rightarrow \cos^2 x = \cos(\pi - x)$$

$$x = \pi \pm \left(\pi - \frac{\pi}{2}\right) \Rightarrow x = \pi + \pi - \frac{\pi}{2} \quad \text{or} \quad x = \pi - \pi + \frac{\pi}{2}$$

$$x = \pi - \pi + \frac{\pi}{2} \Rightarrow x = -\pi \quad \text{or} \quad x = \pi$$

$$|\pi - (-\pi)| = 2\pi$$

$$1 \quad \cos^r x - \sin^r \cos^r x = \cos^r x + \sin^r \quad (V)$$

$$2 \quad -\cos^r x = 1 \quad \cos^r x = -1 = \cos \pi$$

$$3 \quad \cos^r x = \cos \pi \quad r^{\text{th}} x = rK\pi \pm \pi \rightarrow x = \frac{rK\pi}{r} \pm \frac{\pi}{r}$$

$$4 \quad$$

$$5 \quad \frac{1 - \tan x}{1 + \tan x} = \frac{\cos - \sin}{\cos}$$

$$6 \quad \frac{\cos - \sin x}{\cos + \sin} = \tan(xr) \quad \frac{\sin + \cos}{\cos}$$

$$7 \quad$$

$$8 \quad \frac{-\sin(x - \frac{\pi}{2})}{\sin(x + \frac{\pi}{2})} = \frac{\sin(\frac{\pi}{2} - x)}{\sin(x + \frac{\pi}{2})} = \frac{\cos(x + \frac{\pi}{2})}{\sin(x + \frac{\pi}{2})} = \cot(x + \frac{\pi}{2})$$

$$9 \quad \tan(\frac{\pi}{2} - x) = \tan(r\pi) \rightarrow r\pi = \frac{\pi}{2} - x \rightarrow x = K\pi + \frac{\pi}{2}$$

$$10 \quad K\pi + \frac{\pi}{2} - x \rightarrow x = \frac{K\pi}{2} + \frac{\pi}{14}$$

$$11 \quad$$

$$12 \quad \sqrt{1 + \sin x} = \sqrt{1 + r \sin \cos} = \sqrt{\cos^2 + r \sin \cos + \sin^2} = |\cos + \sin|$$

$$13 \quad$$

$$14 \quad \sqrt{\sin x + \frac{\pi}{2}} = \sqrt{r \cos^2 x} \quad (9)$$

$$15 \quad$$

$$16 \quad \sin(x + \frac{\pi}{2}) = \cos x \rightarrow \sin(x + \frac{\pi}{2}) = \cos(\frac{\pi}{2} - x)$$

$$17 \quad \frac{\pi}{2} - x = rK\pi \pm \pi \rightarrow -rK = rK\pi - \frac{\pi}{2} \rightarrow x = \frac{rK\pi}{r} + \frac{\pi}{14}$$

$$18 \quad x = rK\pi - \frac{\pi}{2}$$

$$19 \quad$$

$$20 \quad \sin^r - \cos^r = 1 \quad \text{R.H.S.} \quad \sin^r = 1 = \sin = \pm 1$$

$$21 \quad x = + \frac{\pi}{r} + \frac{r\pi}{r} \quad (1)$$

$$22 \quad$$

$$23 \quad \sin^r - \cos^r = 1 \quad \sin^r = 1 \quad \sin x = 1 \Rightarrow x = \pi/r$$

$$24 \quad \cos^r = -1 \quad \cos x = -1 \rightarrow x = \pi \quad x = \pi, \pi/r$$

$$25 \quad$$

$$26 \quad$$

$$27 \quad$$

$$28 \quad$$

$$29 \quad$$

$$30 \quad$$