DSSSB TGT PART(B)

MATHS

RIEMANN INTEGRATION

LIVE STREAMING 07/10/2024 08:00 AM

Formula of hyperbolic function

Type-1

① $\cosh^2 x - \sinh^2 x = 1$

② $\operatorname{sech}^2 x + \tanh^2 x = 1$

③ $\coth^2 x - \operatorname{cosech}^2 x = 1$

Type-2

① $\sinh(x \pm y) = \sinh x . \cosh y \pm \cosh x . \sinh y$.

② $\cosh(x \pm y) = \cosh x . \cosh y \pm \sinh x . \sinh y$.

③ $\tanh(x \pm y) = \dfrac{\tanh x \pm \tanh y}{1 \pm \tanh x . \tanh y}$.

Type - ③

① $\sinh 2x \Rightarrow 2\sinh x \cdot \cosh x \;/\; \dfrac{2\tanh x}{1-\tanh^2 x}$.

② $\cosh 2x = \cosh^2 x + \sinh^2 x \;/\; 2\cosh^2 x - 1 \;/\; 1 + 2\sinh^2 x \;/\; \dfrac{1+\tanh^2 x}{1-\tanh^2 x}$

③. $\tanh 2x = \dfrac{2\tanh x}{1+\tanh^2 x}$.

Type-④

① $\sinh 3x \Rightarrow 3\sinh x + 4\sinh^3 x$

② $\cosh 3x \Rightarrow 4\cosh^3 x - 3\cosh x.$

③ $\tanh 3x \Rightarrow \dfrac{3\tanh x + \tanh^3 x}{1 + 3\tanh^2 x}$

Type-5

① $2\sinh A \cdot \cosh B \Rightarrow \sinh(A+B) + \sinh(A-B)$.

② $2\cosh A \cdot \sinh B \Rightarrow \sinh(A+B) - \sinh(A-B)$.

③ $2\cosh A \cdot \cosh B \Rightarrow \cosh(A+B) + \cosh(A-B)$.

doubt.

④ $2\sinh A \cdot \sinh B \Rightarrow \cosh(A+B) - \cosh(A-B)$.

Type-6

① $\sinh C + \sinh D \Rightarrow 2\sinh\frac{C+D}{2}\cdot\cosh\left(\frac{C-D}{2}\right)$.

② $\sinh C - \sinh D \Rightarrow 2\cosh\frac{C+D}{2}\cdot\sinh\left(\frac{C-D}{2}\right)$.

③ $\cosh C + \cosh D \Rightarrow 2\cosh\frac{C+D}{2}\cdot\cosh\frac{C-D}{2}$.

④ $\cosh C - \cosh D \Rightarrow 2\sinh\frac{C+D}{2}\cdot\sinh\frac{C-D}{2}$.

Inverse hyperbolic function

$\sinh^{-1}x \,/\, \cosh^{-1}x \,/\, \tanh^{-1}x \,/\, \coth^{-1}x \,/\, \operatorname{sech}^{-1}x \,/\, \operatorname{cosech}^{-1}x$.

① $\sinh^{-1}x \Rightarrow \log\left(x+\sqrt{x^2+1}\right)$.

② $\cosh^{-1}x \Rightarrow \log\left(x+\sqrt{x^2-1}\right)$.

③ $\tanh^{-1}x \Rightarrow \frac{1}{2}\log\frac{1+x}{1-x}$

Inverse circular hyperbolic function

i

$\sin(x+iy) \longrightarrow u+iv$

$x+iy \longrightarrow \sin^{-1}(u+iv)$.

Relation between inverse circular hyperbolic function and. Inverse hyperbolic Function

(1) $\sin h^{-1}x = -i \sin h^{-1} x$

(2) $\cos h^{-1}x = -i \cos h^{-1} x$

(3) $\tan h^{-1}x = -i \tan h^{-1}(ix)$

(4) $\operatorname{cosec} h^{-1}x = -i (\operatorname{cosec} h^{-1}(-ix)$

(5) $\sec h^{-1}x \Rightarrow -i \sec h^{-1} x$

(6) $\cot h^{-1}x \Rightarrow -i \cot h^{-1}(-ix)$.

Ques Period of $\coth x$ is.

(a) $\frac{\pi}{2}i$

(b) $2\pi i$

(c) π

(d) None.

$\cot x \to \pi$

$\coth x \to \pi i$

$\sin x / \cos x \to 2\pi$

$\tan x / \cot x \to \pi$

Qu: The value of $\cosh^{-1}(\sqrt{5})$.

(a) $\log(\sqrt{5}+2)$ —

(b) $\log(\sqrt{5}-2)$

(c) $\log(\sqrt{2}+5)$

(d) $\log(\sqrt{2}-5)$

$\cosh^{-1}x \to \log(x+\sqrt{x^2-1})$.

$\log(\sqrt{5}+2)$ //

Q. which is incorrect.?

(a) $\cosh\theta = \frac{e^{i\theta} + e^{-i\theta}}{2}$ ✓

(b) $\sinh\theta = \frac{e^{i\theta} - e^{-i\theta}}{2i}$ ✓

(c) $\sinh\theta = \frac{e^{i\theta} - e^{-i\theta}}{2}$ ✗

(d) $\cos\theta = \frac{e^{i\theta} + e^{-i\theta}}{2}$ ✓

Q. $\cos(x+iy)$ is equal to.

(a) $\cos x \cdot \cos y - i \sin x \cdot \sin y$

(b) $\cos x \cdot \cosh y + i \sin x \cdot \sinh y$

(c) $\cos x \cdot \cosh y - i \sin x \cdot \sinh y$

(d) $\cos x \cdot \cosh y - i \sin x \cdot \sin y$

$\cos x \cos(iy) - \sin x \sin(iy)$

$\cos x \cdot \cosh y - i \sin x \cdot \sinh y$