



MATHS

BOOKS - TELUGU ACADEMY MATHS (TELUGU ENGLISH)

HYPERBOLIC FUNCTIONS

Vsaq 1 D Star Q

1. Prove that $\cosh^2 x - \sinh^2 x = 1$



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2. Prove that $\cosh^4 x - \sinh^4 x = \cosh 2x$



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3. Prove that $\cosh 2x = 2 \cosh^2 x - 1$



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4. Prove that $\sinh(3x) = 3 \sinh x + 4 \sinh^3 x, \forall x \in R$



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5. P.T $\tanh 3x = \frac{3 \tanh x + \tanh^3 x}{1 + 3 \tanh^2 x}, \forall x \in R$



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6. Prove that

$$(\cosh x - \sinh x)^n = \cosh(nx) - \sinh(nx)$$



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7. $\sinh x = 3/4$ then find $\cosh 2x$ and $\sinh 2x$.



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8. If $\cosh x = 5/2$, then find the values of

$$\cosh(2x)$$



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9. If $\cosh x = 5/2$, then find the values of $\sinh(2x)$

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10. If $\sinh x = 3$ then show that $x = \log(3 + \sqrt{10})$

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11. S.T $\frac{\tanh^{-1} 1}{2} = \frac{1}{2} \log_e 3.$

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12. If

$\cosh x = \sec \theta$ then prove that $\tanh^2 \frac{x}{2} = \tan^2 \frac{\theta}{2}$



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Vsaq 2 D Hard Q 3 D Mis Q

1. Prove that

$$\sinh(x - y) = \sinh x \cosh y - \cosh x \sinh y.$$



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2. Prove that $\tanh(x - y) = \frac{\tanh x - \tanh y}{1 - \tanh x \tanh y}$

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3. Prove that

$$\frac{\cosh x}{1 - \tanh x} + \frac{\sinh x}{1 - \coth x} = \sinh x + \cosh x, \quad \text{for } x \neq 0$$

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Spq

1. P.T $\cosh^2 x + \sinh^2 x = \cosh 2x$

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2. Prove that $\cosh 3x = 4 \cosh^3 x - 3 \cosh x$



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3. Prove that

$$(\cosh x + \sinh x)^n = \cosh(nx) + \sinh(nx)$$



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4. If $\cosh x = 3/2$, then find the value of (i) $\sinh 2x$ (ii)

$\cosh 2x$



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5. If $\sinh x = 5$, then S.T $x = \log_e (5 + \sqrt{26})$

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6. If $\tanh x = 1/4$, then prove that $x = \frac{1}{2} \log_e \left(\frac{5}{3} \right)$

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7. Prove that

$$\sinh(x + y) = \sinh x \cosh y + \cosh x \sinh y$$

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8. Prove that $\operatorname{coth}(x - y) = \frac{\operatorname{coth} x \cdot \operatorname{coth} y - 1}{\operatorname{coth} y - \operatorname{coth} x}$



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