

6C Hyperbolic Equations and Identities

1. Prove that:

a)

$$\cosh^2 A - \sinh^2 A \equiv 1$$

b)

$$\sinh(A + B) \equiv \sinh A \cosh B + \cosh A \sinh B$$

c)

$$\cosh 2A \equiv 1 + 2\sinh^2 A$$

Osborn's Rule:

2. Write down the hyperbolic identity corresponding to:
a)

$$\cos 2A \equiv 2\cos^2 A - 1$$

- b)

$$\tan(A - B) \equiv \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

3. Given that $\sinh x = \frac{3}{4}$, find the exact value of:

a) $\cosh x$

b) $\tanh x$

c) $\sinh 2x$

4. Solve the equation below for real values of x .

$$6 \sinh x - 2 \cosh x = 7$$

5. Solve the equation below, giving answers as natural logarithms.

$$2 \cosh^2 x - 5 \sinh x = 5$$

6. Solve the equation below, giving answers as natural logarithms where appropriate.

$$\cosh 2x - 5 \cosh x + 4 = 0$$

Some additions to Osborn's rule