Hyperbolic Functions: Tutorial Sheet

Using their definition in terms of exponentials, prove the following hyperbolic identities.

1. Show that
$$\cosh^2(x) = \frac{1 + \cosh(2x)}{2}.$$
2. Show that
$$\cosh^2 x = \cosh 2x + \sinh 2x$$
3. Show that
$$\cosh^2(x) = \frac{1 + \cosh(2x)}{2}.$$
4. Show that
$$\cosh(x + y) = \cosh(x)\cosh(y) + \sinh(x)\sinh(y)$$
5. Show that
$$\cosh^2 x - \sinh^2 x = 1$$
6. Show that
$$\sinh^2(x) = \frac{1}{2}\left[\cosh(2x) - 1\right]$$