7.

Proof:

Prove by induction.

For n=1, $2^n=2=2^{n+1}-2$

Assume statement holds for n

For n+1

$2+2^2+2^3+\cdots+2^n+2^{n+1}=2^{n+1}-2+2^{n+1}$ (by the induction hypothesis)

$=2\times2^{n+1}-2=2^{n+2}-2=2^{(n+1)+1}-2$

So, the equality holds for n+1

The statement has been proved by induction.