1. Let a be an arbitrary real number. Prove, for all natural numbers m and n, that $a^{m \times n} = (a^m)^n$.

Answer:

Base case
$a^{0 \times n} = (a^m)^0$
$1 = 1^n$

Induction case
$a^{m(n+1)} = (a^m)^{n+1}$
$a^{mn+m} = (a^m)^{n+1}$
$a^{mn} \times a^m = (a^m)^{n+1}$
$(a^m)^n \times a^m = (a^m)^{n+1}$