

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

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

$$1 = 1$$

Induction case

$$a^{m(n+1)} = (a^m)^{n+1}$$

$$a^{mn+m} = (a^m)^{n+1}$$

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

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