Find the number of terms free from the radical sign in $\{(7)^{1/3} + (11)^{1/9}\}^{654}$.

According to the the binomial theorem, it is possible to expand any power of x + y into a sum of the form

$$(x+y)^n = \binom{n}{0} x^n y^0 + \binom{n}{1} x^{n-1} y^1 + \binom{n}{2} x^{n-2} y^2 + \cdots + \binom{n}{n-1} x^1 y^{n-1} + \binom{n}{n} x^0 y^n.$$

Let $x = (7)^{1/3}$, $y = (11)^{1/9}$.

As 6+5+4=15 the number 654 is divisible by 3 but is not divisible by 9. Free of radical terms will be the terms with power of y divisible by 9 including 0. The corresponding power of x will be divisible by 3. The 648 is divisible by 9, 648/9=72, $648 + 9 = 657 > 654$. Thus we have 72 integers from 1 to 654 which are divisible by 9. As we must include 0. The answer will be 72+1=73.