11. If tan (A + B) = p, tan (A – B) = q, then show that tan 2A = (p + q) / (1 – pq).
[Hint: Use 2A = (A + B) + (A – B)]

Solution:

We know that,

tan 2A = tan (A + B + A – B)

And also,

$$\tan(x+y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$$

$$\therefore \tan 2A = \frac{\tan(A+B) + \tan(A-B)}{1 - \tan(A+B)\tan(A-B)}$$

Substituting the values given in question,

$$\Rightarrow \tan 2A = \frac{p+q}{1-pq}$$

Hence, $\tan 2A = \frac{p+q}{1-pq}$