

Question 15: If the roots of the quadratic equation $x^2 + px + q = 0$ are $\tan 30^\circ$ and $\tan 15^\circ$, respectively then the value of $2+q-p$ is

- (a) 2
- (b) 3
- (c) 0
- (d) 1

Solution:

Given that $x^2 + px + q = 0$

Sum of roots = $\tan 30^\circ + \tan 15^\circ = -p$

Product of roots = $\tan 30^\circ \tan 15^\circ = q$

We know $\tan (a+b) = (\tan a + \tan b)/(1 - \tan a \tan b)$

$\tan 45^\circ = \tan (30 + 15)^\circ$

$1 = (\tan 30^\circ + \tan 15^\circ)/(1 - \tan 30^\circ \tan 15^\circ)$

$1 = -p/(1-q)$

$\Rightarrow 1-q = -p$

$q-p = 1$

$2+q-p = 2+1$

$= 3$

Hence option b is the answer.