

Let  $f(x) = \tan^{-1}(x^2 - 18x + a) > 0 \forall x \in R$ . Then the value of  $a$  lies in

(1)  $(81, \infty)$

(2)  $[81, \infty)$

(3)  $(-\infty, 81)$

(4)  $(-\infty, 81]$

Answer (1)

Given  $f(x) = \tan^{-1}(x^2 - 18x + a) > 0$

$$\Rightarrow \tan^{-1}(x^2 - 18x + a) > 0$$

$$\Rightarrow x^2 - 18x + a > 0$$

$$\Rightarrow 18^2 - 4a < 0$$

$$\Rightarrow a > \frac{18^2}{4} = \frac{18 \times 18}{4} = 81$$

$$\Rightarrow a > 81$$

$$\Rightarrow a \in (81, \infty)$$