The set of all real numbers x for which $x^2-|x+2|+x>0$,

A) $(-\infty, -2) \cup (2, \infty)$

B) $(-\infty, -\sqrt{2}) \cup (\sqrt{2}, \infty)$

C) $(-\infty, -1) \cup (1, \infty)$

D) $(\sqrt{2}, \infty)$

Correct Answer: B

Solution:

Case I: When $x+2\geq 0$

i.e. $x\geq -2$,

Then given inequality becomes $x^2-(x+2)+x>0$

$X^2-2>0 \Rightarrow |x|>\sqrt{2}$

$x<-\sqrt{2}$

or $x>\sqrt{2}$

As $x\geq -2$,

therefore, in this case the part of the solution set is

$[-2, -\sqrt{2}) \cup (\sqrt{2}, \infty)$.

Case II: When $x+2\leq 0$

i.e. $x\leq -2$,

Then given inequality becomes

$X^2+(x+2)+x>0$

$\Rightarrow x^2+2x+2>0$

$\Rightarrow (x+1)^2+1>0$,

which is true for all real x Hence, the part of the solution set in this case is

$(-\infty, -2]$

. Combining the two cases, the solution set is

$(-\infty, -2) \cup ([-2, -\sqrt{2}] \cup (\sqrt{2}, \infty)$

$= (-\infty, -\sqrt{2}) \cup (\sqrt{2}, \infty)$.