

The solution set of the inequality $|x + 2| - |x - 1| < x - \frac{3}{2}$ is

A) $\left(\frac{9}{2}, \infty\right)$

B) $\left(-\infty, \frac{3}{2}\right)$

C) $\left(-2, -\frac{3}{2}\right)$

D) $\left(-1, \frac{3}{2}\right)$

[a] The inequality is $|x + 2| - |x - 1| < x - \frac{3}{2}$

(i) if $x < -2$, then $-(x + 2) + (x - 1) < x - \frac{3}{2}$

$$\Rightarrow x > -\frac{3}{2}$$

But $-\frac{3}{2} > -2$ hence no common values

$$\Rightarrow x \in \phi$$

(ii) If $-2 \leq x < 1$ then $(x + 2) + (x - 1) < x - \frac{3}{2}$

$$\Rightarrow x < -\frac{5}{2}$$

But $-\frac{5}{2} < -2$ hence no common values

$$\Rightarrow x \in \phi$$

(iii) If $x \geq 1$, then $(x + 2) - (x - 1) < x - \frac{3}{2}$

$$\Rightarrow x > \frac{9}{2}$$

$$\therefore \frac{9}{2} > 1$$

\Rightarrow common solution is

$$x > \frac{9}{2} \Rightarrow x \in \left(\frac{9}{2}, \infty\right)$$

Solution set is $x \in \left(\frac{9}{2}, \infty\right)$