The graph of the function

$$y = \cos x \cos(x+2) - \cos^2(x+1)$$

is

(A) a straight line passing through $(0, -\sin^2 1)$ with slope 2

(B) a straight line passing through (0, 0)

(C) a parabola with vertex $(1, -\sin^2 1)$

(D) a straight line passing through the point $\left(\dfrac{\pi}{2}, -\sin^2 1 \right)$ and parallel to the x-axis
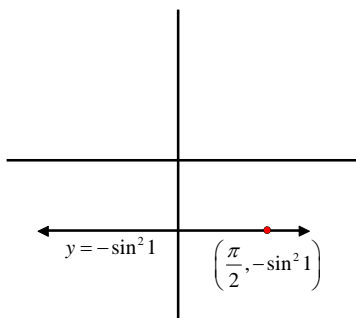
Solution

We have, $2y = 2\cos x \cos(x+2) - 2\cos^2(x+1)$

$\therefore 2y = \cos(2x+2) + \cos 2 - \{1 + \cos(2x+2)\}$

$\therefore 2y = -(1 - \cos 2) = -2\sin^2 1$

$\therefore y = -\sin^2 1$

Answer: (D)