Question 14: The area bounded by the curve

$y \leq x^2 + 3x, 0 \leq y \leq 4, 0 \leq x \leq 3$
is

(a)

$\frac{59}{6}$
(b)
$\frac{57}{4}$
(c)
$\frac{59}{3}$
(d)
$\frac{57}{6}$

Answer: (a)

Solution:

$y = x^2 + 3x = 4$

$\Rightarrow x^2 + 3x = 4$

$\Rightarrow x^2 + 3x - 4 = 0 \Rightarrow x = 1 \; or \; x = -4$

Area

$= \int_0^1 \left(x^2 + 3x\right).\, dx +$
Area + Rectangle

$= \left[\frac{x^3}{3} + \frac{3x^2}{2}\right]_0^1 + 2\,(4)$

$= \frac{1}{3} + \frac{3}{2} + 8 = \frac{59}{6}$