Date

from graph, we can easily see.

$T(-3,1) = (2,2)$
$T(5,2) = (1,3)$

Now,

let $(x,y) = a(-3,1) + b(5,2)$
$= -3a + 5b,\ a+2b$

$-3a + 5b = x$ and $a + 2b = y$

solve for a & b

$$-3a - 6b = -3y$$
$$\underline{-3a + 5b = x}$$
$$-11b = -3y - x \rightarrow \boxed{b = \frac{3y+x}{11}}$$

$$a = y - 2b$$
$$= y - 2\left(\frac{3y+x}{11}\right) = \boxed{\frac{5y-2x}{11} = a}$$

Thus

$$(x,y) = a(-3,1) + b(5,2)$$
$$= \left(\frac{5y-2x}{11}\right)(-3,1) + \left(\frac{3y+x}{11}\right)(5,2)$$

$$T(x,y) = \frac{5y-2x}{11}T(-3,1) + \frac{3y+x}{11}T(5,2)$$

$$= \frac{5y-2x}{11}(2,2) + \frac{3y+x}{11}(1,3)$$

$$= \left(\frac{10y-4x}{11} + \frac{3y+x}{11},\ \frac{10y-4x}{11} + \frac{9y+3x}{11}\right)$$

we know that standard basis of

$R^2 = (1,0)$ and $(0,1)$

$$T(0,1) = \left(-\frac{4}{11} + \frac{1}{11}, \frac{-4}{11} + \frac{3}{11}\right)$$

$$= \left(\frac{-3}{11}, \frac{-1}{11}\right)$$

$$T(0,1) = \left(\frac{10}{11} + \frac{3}{11}, \frac{10}{11} + \frac{9}{11}\right) = \left(\frac{13}{11}, \frac{19}{11}\right)$$

Then $[T]_B = [T(e_1) \; T(e_2)]$

$$= \begin{bmatrix} -\frac{3}{11} & \frac{13}{11} \\ \frac{-1}{11} & \frac{19}{11} \end{bmatrix} = \boxed{\frac{1}{11}\begin{bmatrix} -3 & 13 \\ -1 & 11 \end{bmatrix}}$$

option C is corr