∴ If we have $2 \mid y^2(x^2+3)$ $\boxed{A}$ either x is odd (case 1a) or y is even (case 1b) as only in those cases is $\boxed{A}$ true regardless of the other value.

* Case 1 is true so we move on to case 2!

Case $\boxed{2}$: Assume x is odd or y is even, Let $\exists k \in \mathbb{Z}$

Case 2a: x is odd

$\Rightarrow (y^2(x^2+3)(y^2+6)$

$\Rightarrow ((2k+1)^2+3)(y^2+6)$

$\Rightarrow y^2(4k^2+4k+1+3)(y^2+6)$

$\Rightarrow y^2(4k^2+4k+4)(y^2+6)$

$\Rightarrow 2\underbrace{y^2(2k^2+2k+4)(y^2+6)}_{a_2}$

$\exists a_2 \in \mathbb{Z}$, $a_2 = y^2(2k^2+2k+4)(y^2+6)$

$\Rightarrow 2a_2$

$\Rightarrow 2 \mid 2a_2$

Case 2b: y is even

$\Rightarrow (y^2+6)(x^2+3)$

$\Rightarrow ((2k)^2+6)(x^2+3)$

$\Rightarrow (4k^2+6)(x^2+3)$

$\Rightarrow 2\underbrace{(2k^2+3)(x^2+3)}_{b_2}$

$\exists b_2 \in \mathbb{Z}$, $b_2 = (2k^2+3)(x^2+3)$

$\Rightarrow 2b_2$

$\Rightarrow 2 \mid b_2$

∴ we know that in case 2a and case 2b, that $(y^2+6)(x+3)$ is divisible by 2. Thus we have proved $\boxed{2}$

∴ Since $\boxed{1}$ and $\boxed{2}$ is true, the original statement will be true for all x or y integers.