2) Find the coefficient of x^{50} in $(1+x)^{101} \times (1-x+x^2)^{100}$

Solution: $(1+x)^{101}(1-x+x^2)^{100}$

$= (1+x)[(1+x)^{100}(1-x+x^2)^{100}]$

$= (1+x)(1-x^3)^{100}$

$= (1-x^3)^{100} + x(1-x^3)^{100}$

Now, coefficient of x^{50} in $[(1-x^3)^{100} + x(1-x^3)^{100}]$ is

Coefficient of x^{50} in $(1-x^3)^{100}$ + coefficient of x^{49} in $(1-x^3)^{100}$

$= \boxed{0}$ (as 49 and 50 are not a multiple of 3)