

Partial credit will be assigned based upon the correctness, completeness, and clarity of your answers. **Correct answers without proper justification will not receive any credit.**

Exercise 1. When playing darts, Damien has a probability 0.001 of hitting the center of the board.

1. What is the probability that he will hit the center of the board at least once after 100 throws ?
2. Give a normal approximation of the above probability.

Exercise 2. Let X and Y be two random variables with joint probability distribution given by:

$X \backslash Y$	$y_1 = 0$	$y_2 = 1$	$y_3 = 2$	$\mathbb{P}(X = x_i)$
$x_1 = 0$	1/4	1/4		1/2
$x_2 = 1$	0	1/8	1/8	
$x_3 = 2$	1/4			
$\mathbb{P}(Y = y_j)$	3/8			

1. Complete the table.
2. Compute $\mathbb{P}(X = 1, Y = 2)$.
3. Are X and Y independent?