

# Math 101 Homework

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Complete the following problems. Fully justify each response.

1. Let  $X$  be the probability space of 4 flips of a weighted coin, that has  $\mathbb{P}(H) = 3/4$  and  $\mathbb{P}(T) = 1/4$ . Let  $A$  be the event that the outcome has at least 2 heads. Determine  $\mathbb{P}(A)$ .
2. Let  $X$  be the probability space of 3 flips of a weighted coin, that has  $\mathbb{P}(H) = p$  and  $\mathbb{P}(T) = 1 - p$ . Show carefully that the three events  $A_1 = \{\text{first flip is H}\}$ ,  $A_2 = \{\text{second flip is H}\}$ , and  $A_3 = \{\text{third flip is H}\}$  are mutually independent.