Assignment 1

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Total Probability,

$P = P_0 + P_1 + P_2$

$P = \frac{5^6}{6^6} + \frac{5^5}{6^6} + \frac{5^4}{6^6}$

$P = 0.41527$

1 PROBLEM

(4.6) Find the probability of throwing at most 2 sixes in 6 throws of a single die.

2 SOLUTION

Let X

$X \epsilon \{1, 2, 3, 4, 5, 6\}$

Since all events are equally likely,

$$Pr(X = i) = \begin{cases} 1/6 & \text{if i=6} \\ 5/6 & \text{if i is greater than zero and less than 6} \\ 0 & \text{otherwise} \end{cases}$$

For probability of getting at most 2 sixes in six throws of a die:

Case-1: There are no sixes .
This implies, for all throws $1 \leq i \leq 5$
$P_0 = Pr(X = i)^6 = \frac{5^6}{6^6}$

Case-2: There is only 1 six.
For one of the throws, i=6
For the rest 5 throws $1 \leq i \leq 5$
$P_1 = \frac{1}{6} \times \frac{5^5}{6^5}$

Case-3: There are 2 sixes.
For two of the throws, i=6
For the rest 4 throws $1 \leq i \leq 5$
$P_2 = \frac{1^2}{6^2} \times \frac{5^4}{6^4}$