Assignment 1

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$$\Pr(X \geq 4) = \sum_{i=4}^{6} {}^{6}C_i p^i (1-p)^{6-i} \qquad (2.0.4)$$

$$= \frac{240}{729} + \frac{192}{729} + \frac{64}{729} \qquad (2.0.5)$$

$$= \frac{496}{729} \qquad (2.0.6)$$

Hence, probability of at least 4 successes in the next six trials is $\frac{496}{729} = 0.680384$.

1 PROBLEM

(3.2) An experiment succeeds twice as often as it fails. Find the probability that in the next six trials, there will be at least 4 successes.

2 SOLUTION

Variable	Description
n	number of trials
X	random variable denoting the number of successes in n trials
p	probability of success in each trial

TABLE I: Description of variables

As per question,

$$p = 2(1-p) \qquad (2.0.1)$$

$$\implies p = 2/3 \qquad (2.0.2)$$

For a binomial distribution,

$$\Pr(X = k) = {}^{n}C_k p^k (1-p)^{n-k} \qquad (2.0.3)$$

For the given question, From (2.0.3) we have,

Variable	n	p
Value	6	2/3

TABLE II: Value of variables