Stat 451 Homework #6

5.2 Binomial distribution with $n = 12$ and $p = 0.5$. Hence
$P(X = 3) = P(X \leq 3) - P(X \leq 2) = 0.0730 - 0.0193 = 0.0537.$

5.12 From Table A.1 with $n = 9$ and $p = 0.25$, we have $P(X < 4) = 0.8343$.

5.16 Probability of 2 or more of 4 engines operating when $p = 0.6$ is

$$P(X \geq 2) = 1 - P(X \leq 1) = 0.8208,$$

and the probability of 1 or more of 2 engines operating when $p = 0.6$ is

$$P(X \geq 1) = 1 - P(X = 0) = 0.8400.$$

The 2-engine plane has a slightly higher probability for a successful flight when $p = 0.6$.

5.30 $P(X \geq 1) = 1 - P(X = 0) = 1 - h(0; 15, 3, 6) = 1 - \frac{\binom{6}{0}\binom{9}{3}}{\binom{15}{3}} = \frac{53}{65}.$

5.32 (a) Probability that all 4 fire $= h(4; 10, 4, 7) = \frac{1}{6}$.

(b) Probability that at most 2 will not fire $= \sum_{x=0}^{2} h(x; 10, 4, 3) = \frac{29}{30}$.

5.48 (a) $\frac{\binom{2}{1}\binom{13}{4}}{\binom{15}{5}} = 0.4762.$

(b) $\frac{\binom{2}{2}\binom{13}{3}}{\binom{15}{5}} = 0.0952.$