

$$1. a) \frac{3\binom{5}{1} + 6\binom{5}{1} - 3}{\rightarrow P_3} = \frac{15 + 30 - 3}{210} = .2$$

$$b) \binom{10}{4} (.2)^4 (1-.2)^6 = .088$$

2. a) events are independent when $P(A \cap B) = P(A) \cdot P(B)$

$$P(A \cap B) = 0 \quad P(A) = \frac{1}{4} \quad P(B) = \frac{1}{4}$$

so $0 \neq \frac{1}{16}$ not independent

$$b) P(X=3) = \frac{1}{16}$$

$$P(X=2) = \frac{1}{8}$$

$$P(X=1) = \frac{5}{16}$$

$$P(X=0) = \frac{1}{2}$$

$$0\left(\frac{1}{2}\right) + 1\left(\frac{5}{16}\right) + 2\left(\frac{1}{8}\right) + 3\left(\frac{1}{16}\right) = E(X)$$

$$= \frac{12}{16} = \frac{3}{4}$$

$$4. a) \frac{\binom{99}{1}}{\binom{100}{1}} = .99$$

$$b) P(\text{match} | \text{innocent}) = \frac{P(\text{match} \cap \text{innocent})}{P(\text{innocent})} = \frac{\binom{99}{1}}{\binom{99999}{1}}$$

$$c) 1 - \frac{\binom{99900}{1000}}{\binom{100000}{1000}}$$

$$5. P(2G | R | 2G \text{ OR}) = \frac{P(2G \text{ OR} | 2G | R) P(2G | R)}{P(2G \text{ OR})} = \frac{.8 \left(.7 \cdot \frac{3}{4} \right)}{.3 \left(\frac{1}{4} \right) + .7 \left(\frac{3}{4} \right) (.8)} = .737$$

$$3. \text{Nasty} \\ P(X=1) = \frac{1}{5}$$

$$P(X=2) = \frac{2}{5} + \frac{2}{10}$$

$$P(X=3) = \frac{2}{10}$$

$$\text{Hasty}$$

$$P(X=1) = \frac{1}{5}$$

$$P(X=2) = \frac{4}{5}$$

$$1\left(\frac{1}{5}\right) + 2\left(\frac{3}{5}\right) + 3\left(\frac{2}{10}\right) = E(\text{Nasty}) = 2$$

$$E(\text{Hasty}) = \frac{1}{5}(1) + 2\left(\frac{4}{5}\right)$$

$$= \frac{9}{5}$$

So you should
choose hasty