

Question 1:

$$a) P(\text{Exactly 3 pink flower seeds}) = \frac{\binom{6}{3} \binom{4}{1}}{\binom{10}{4}}$$

$$b) P(\text{at least 3 pink flower seeds})$$

$$= P(\text{exactly 3 pink flower seeds})$$

$$+ P(\text{exactly 4 pink flower seeds})$$

$$= \frac{\binom{6}{3} \binom{4}{1}}{\binom{10}{4}} + \frac{\binom{6}{4} \binom{4}{0}}{\binom{10}{4}}$$

$$c) P(\text{all four identical colored seeds})$$

$$= P(4 \text{ pink flower seeds}) + P(4 \text{ white flower seeds})$$

$$= \frac{\binom{6}{4} \binom{4}{0}}{\binom{10}{4}} + \frac{\binom{4}{4} \binom{6}{0}}{\binom{10}{4}}$$

Question 2:

	M	F	Total
I	9	6	15
NI	7	8	15
Total	16	14	30

$$P(F|NI)$$

$$= \frac{\#(F \cap NI)}{\#NI}$$

$$= \frac{8}{15}$$

$$P(NI|M) = \frac{\#(M \cap NI)}{\#M}$$

$$= \frac{7}{16}$$

### Question 3

$$a) P(A \cap B) = P(B|A)P(A) = \frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$$

$$b) P(B|A) \neq P(B|A^c) \quad \boxed{\text{NOT INDEPENDENT}}$$

$$c) P(A \cap B) \neq 0 \quad \boxed{\text{NOT MUTUALLY EXCLUSIVE}}$$

### Question 4

a)  $X$ : # of businesses with irregularities

$$X \sim \text{Bin}(16, 0.116)$$

$$P(X=5) = \binom{16}{5} (0.116)^5 (0.884)^{11}$$

$$b) P(X \geq 1) = 1 - P(X=0)$$

$$c) P(X < 5) = P(X=0) + P(X=1) + \dots + P(X=4)$$

$$d) P(X \leq 5) = P(X=0) + \dots + P(X=5)$$

$$e) P(X > 5) = 1 - P(X \leq 5)$$

$$f) P(X \leq 5)$$

$$g) P(X \geq 5) = 1 - P(X \leq 4)$$