



$$P(\text{Apple A}) = \frac{2}{6} = \frac{1}{3} \quad P(\text{Apple B}) = \frac{8}{12} = \frac{2}{3} \quad P(\text{Apple C}) = \frac{1}{4}$$

$$P(\text{Orange A}) = \frac{4}{6} = \frac{2}{3} \quad P(\text{Orange B}) = \frac{4}{12} = \frac{1}{3} \quad P(\text{Orange C}) = \frac{3}{4}$$

a) Picking 1 fruit from each bag, in order, to get exactly 2 apples, either one of the following must happen:

$$P(2 \text{ Apples}) = P(\text{Apple A} \cap \text{Apple B} \cap \text{Orange C})$$

$$\text{"or"} \rightarrow + P(\text{Apple A} \cap \text{Orange B} \cap \text{Apple C})$$

$$\rightarrow + P(\text{Orange A} \cap \text{Apple B} \cap \text{Apple C})$$

$$= \frac{1}{3} \cdot \frac{2}{3} \cdot \frac{3}{4} + \frac{1}{3} \cdot \frac{1}{3} \cdot \frac{1}{4} + \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{1}{4} = \boxed{\frac{11}{36}}$$

$$b) P(\text{Apple A} | 2 \text{ Apples}) = \frac{P(\text{Apple A} \cap 2 \text{ Apples})}{P(2 \text{ Apples})} =$$

$$= \frac{P(\text{Apple A} \cap \text{Apple B} \cap \text{Orange C}) + P(\text{Apple A} \cap \text{Orange B} \cap \text{Apple C})}{P(2 \text{ Apples})}$$

$$= \frac{\frac{1}{3} \cdot \frac{2}{3} \cdot \frac{3}{4} + \frac{1}{3} \cdot \frac{1}{3} \cdot \frac{1}{4}}{\frac{11}{36}} = \frac{7/36}{11/36} = \boxed{\frac{7}{11}}$$