

Probability

1 8 questions among 15 questions
 $\rightarrow 7$ cases where no one is asked multiple questions
 $15-8 = 7$ $\frac{7}{15}$

2 3 dig. 7: $5 \cdot 4 \cdot 3 = 120$
 4 dig. 5: $5 \cdot 4 \cdot 3 \cdot 2 = 120$
 5 dig. 1: $5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$

0-1111 \rightarrow 10000 numbers

$$\frac{120 + 120 + 120}{10000} = \frac{1}{20}$$

$$\left(\frac{1}{20} \right)^5 \cdot \left(\frac{19}{20} \right)^3 \cdot \text{choice 5}$$

3

A) all 4 or more: $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$

2 or 4 or more: $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot (\text{choice 2}) = \frac{3}{8}$

$$\frac{1}{8} + \frac{3}{8} = \frac{1}{2}$$

B) $\frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$

$P(A \cap B) = \text{XXXXXXXXXXXXXXXXXXXX}$

all 1 all 5 all 6
 $\frac{1}{216} + \frac{1}{216} + \frac{1}{216} = \frac{3}{216} = \frac{1}{72}$

$$P(A \cup B) = \frac{1}{2} - \frac{1}{72} = \frac{35}{72}$$

in calculator

4 prob flash: $4 \cdot \frac{\binom{13}{5}}{\binom{52}{5}}$

$$E(x) = \frac{\binom{52}{5}}{4 \cdot \binom{13}{5}}$$

$$E(x) = \frac{4 \cdot \binom{13}{5}}{\binom{52}{5}} = 1$$

2 senior plays: $\binom{20}{4} \cdot \binom{2}{6} \cdot \binom{4}{4} = 0.36015$

senior desk play: $\binom{10}{5} \cdot \binom{4}{4} = 0.15675$

$$P(\text{total}) = \frac{1}{4} \cdot 0.15675 + \frac{3}{4} \cdot 0.36015 = 0.309175$$

$$\frac{\frac{1}{4} \cdot 0.15675}{0.309175} = P(\text{senior desk}) = 0.0737$$