Probability Problems

1. $\dfrac{\frac{15}{15}}{1} \cdot \dfrac{\frac{14}{15}}{2} \cdot \dfrac{\frac{13}{15}}{3} \cdot \dfrac{\frac{12}{15}}{4} \cdot \dfrac{\frac{11}{15}}{5} \cdot \dfrac{\frac{10}{15}}{6} \cdot \dfrac{\frac{9}{15}}{7} \cdot \dfrac{\frac{8}{15}}{8}$

$$= 0.101$$

2.

$\{3,5,7,9\}$ $\{1,3,5,7,9\}$ $\{7,9,2,4,6,8\}$
4 options   5 options   6 options

$\{5,7,9,2,4,6,8\}$ $\{0,2,4,6,8\}$
7 options   5 even options

$4 \cdot 5 \cdot 5 \cdot 6 \cdot 7 = 4,200$ total options

$$\frac{4200}{10^5} = 0.042$$

3.

$P(A_1)$ $\left(\frac{3}{2}\right)\left(\frac{1}{2}\right)^2 \left(\frac{1}{2}\right)^2 \left(\frac{1}{2}\right) = \frac{3}{8}$

$P(A_2)$ $\left(\frac{3}{3}\right)\left(\frac{1}{2}\right)^3 \left(\frac{1}{2}\right) = \frac{1}{8}$

$P(A) = \boxed{\frac{1}{2}}$

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

$P(A \cap B) = $
$\begin{matrix} 5 & 5 & 5 \\ 4 & 4 & 4 \\ 6 & 6 & 6 \end{matrix}$
$\overset{P(A \cap B)}{\dfrac{1}{72}}$

$\underset{P(A)}{\frac{3}{216}} = \frac{1}{72}$ $\underset{P(A)\quad P(B)}{\frac{1}{2} \cdot \frac{1}{36}} = \frac{1}{72}$

$= .01$

yes, A and B are independent