Probability

1. $\left(\frac{1}{13}\right)\left(\frac{1}{12}\right)\left(\frac{1}{13}\right)\left(\frac{1}{12}\right)\left(\frac{1}{11}\right)\left(\frac{1}{10}\right)\left(\frac{1}{9}\right)\left(\frac{1}{8}\right) = \frac{1}{594,93200}$

2. $5 \cdot 4 \cdot 4 \cdot 7 \cdot 6 = 6720$ out of $100,000$

odd odd-1

$\left(\frac{6720}{100,000}\right)^2 \cdot \left(\frac{93280}{100000}\right)^3 \cdot \binom{6}{5} \approx 0.00006$

3. Independent ✓

4. $\left(\frac{1}{13}\right)^4 \left(\frac{12}{13}\right)^1 \qquad \left(\frac{1}{13}\right)^5 \geq \binom{52}{5}$ where n is true

same suit

$\left(\frac{1}{13}\right)^4 \qquad \binom{52}{5} \rightarrow 2598960$ combos $\rightarrow \frac{5148}{2598960} \approx 0.019\%$

Probability $= \binom{4}{1}\binom{13}{5} = 5148$

suits cards

5. $P(W \mid DNP) = 1/2$

$P(W \mid P) = 7/10$

4 games $P(W \mid P) = \left(\frac{7}{10}\right)^4 \left(\frac{3}{10}\right) \cdot \left(\frac{3}{4}\right) = 0.26$

$P(W \mid DNP) = \left(\frac{5}{10}\right)^5 \cdot \left(\frac{3}{4}\right) = 0.16$

$= 0.79\left(.36\right) + 0.21(0.16) = 0.31$

$= \frac{0.36 \cdot 0.75}{0.31} = 87.1\%$