Probability.pdf

1) $(15 \cdot 14 \cdot 13 \cdots \cdot 8)/15^8 \approx 10\%$

2) $\binom{8}{5}(0.05)^5(1-0.05)^3 \approx \quad = 1.5 \times 10^{-5}$

3) ~~$P(A) = P(2) + P(3)$~~ $P(\text{all poss}) = \frac{\cancel{81} + 27}{6^3}$ $P(B) = 6/6^3 = \frac{1}{36}$

we can see that $P(A) \neq P(A|B)$ because having a same number for all 3 interferes with having 2 or 3 dice values ≥ 4. Since $P(A) \neq P(A|B)$ it is not independent

4) $P(\text{flush}) = 4\binom{13}{5}/\binom{52}{5}$

$E[x] = E[\text{\# of plays to get flush}] = 1/p(\text{flush}) \approx 504.85$

5) $P(T|X) = P(X|T) \cdot P(T) / P(X)$

where $= (7/10) \cdot (3/4) \cdot (5/4) = 65\%$

$P(\text{win } 4/5 \mid \text{play}) = .36$
$P(\text{win } 4/5 \mid \text{no play}) = .16$
$P(\text{win } 4/5) = .31$

$\dfrac{(.36)(.75)}{(.31)} = 87\%$

3) $P(A) = \frac{1}{2}$, $P(B) = \frac{6}{6^3} = \frac{1}{36}$ and $P(A \cap B) = \frac{1}{72}$

and $P(A) \cdot P(B) = \frac{1}{72} = P(A \cap B)$ ✓

So A and B are independent