Independent vs Dependent HW #2

Use your Notes (!!!) with useful formulas and how to tell if an event is independent to answer the below:

Any left blank w/o serious attempt will be graded incomplete

1. If $P(A) = \frac{1}{3}$ and $P(B) = \frac{3}{5}$ and $P(A \text{ and } B) = \frac{1}{5}$ are the events independent?

$\frac{1}{3} \times \frac{3}{5} = \frac{3}{15} = \frac{1}{5}$ ✓ Ind

2. If $P(A) = \frac{1}{4}$ and ~~$P(B) = \frac{2}{5}$~~ and $P(A \mid B) = \frac{6}{20}$ are the events independent?

Dont Need — given!!

$\frac{1}{4} \neq \frac{6}{20}$ Dependent

3. If $P(A) = \frac{2}{7}$ and $P(\text{not } B) = \frac{2}{5}$ and $P(A \cap B) = \frac{1}{5}$ are the events independent?

"And"

$P(B) = \frac{3}{5}$

$\frac{2}{7} \times \frac{3}{5} = \frac{6}{35} \neq \frac{1}{5}$ Depend

4. If $P(A) = \frac{2}{3}$ and $P(B) = \frac{2}{5}$ calculate $P(A \mid B)$.

given → $\frac{P(A \cap B)}{P(B)}$ $\frac{\frac{2}{3} \times \frac{2}{5}}{\frac{2}{5}} = \frac{2}{3}$

Then determine, is this independent or dependent?

$P(A|B) = \frac{2}{3}$ $P(A) = \frac{2}{3}$ They equal, so IND

5. If $P(A) = \frac{2}{3}$, $P(B) = \frac{2}{5}$ and $P(A \text{ and } B) = \frac{3}{15}$, calculate $P(B \mid A)$

→ denom

$\frac{\frac{3}{15}}{\frac{2}{3}} = \frac{3}{10}$

Then determine, is this independent or dependent?

$P(B|A) = \frac{3}{10}$ > Dont Equal

$P(B)$ Alone $= \frac{2}{5}$

Dep