Notes

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1

$$\forall A \in \mathbb{R}$$
$$\frac{\frac{1}{8}}{\frac{1}{2}+\frac{1}{8}}$$
$$\frac{1}{2}$$
$$\Omega$$
$$\omega$$

A. A

B. B

2 Extended Monty Hall Problem

Suppose you have n doors, where behind 1 is the car and behind $n-1$ are goats. Monty Hall will open $k([0, n-2])$ doors as he has to leave one door unopened for you to switch to, and the original door you picked. The chance that you picked the car originally is $\frac{1}{n}$, hence the chance you didn't pick the car is $\frac{n-1}{n}$. When Monty Hall opens k doors, the probability that you should switch to win is now determined by the probability you didn't pick the correct door the first times multiplied by the new probability that you pick the correct door when you switch, given by:

$$\frac{n-1}{n} \cdot \frac{1}{n-k-1} = \frac{1}{n} \cdot \frac{n-1}{n-k-1}$$

Suppose Monty Hall opens $n-2$ doors, then when you switch the probablity of winning becomes apparent:

$$\frac{n-1}{n} \cdot \frac{1}{n-(n-2)-1} = \frac{n-1}{n}$$

In the standard Monty Hall problem where $n = 3$ and $k = 1$, the probability of winning when you switch is:

$$\frac{3-1}{3} \cdot \frac{1}{3-1-1} = \frac{2}{3}$$